Currency and Equivalent Units

Currency Unit = Guatemalan Quetzal (GTQ)
US $1 = 7.8 GTQ
(at official exchange rate, December 2004)

Fiscal Year
January 1 to December 31

Abbreviations and Acronyms

AVANSOC: Association for the Advancement of the Social Services
CA: Central American
CAFTA: Central America Free Trade Agreement
CAS: Country Assistance Strategy
DFID: Department for International Development
ENCIOVI: Encuesta de Hogares (LSMS): Household survey on living standards
ESDD: Environmentally and Social Sustainable Development Department
FAO: Food and Agriculture Organization
FAO/CP: Food and Agriculture Organization Cooperative Program
GDP: Gross Domestic Product
GIS: Geographic Information System
GoG: Government of Guatemala
Ha: Hectare
HIPC: Highly Indebted Poor Country
IADB: Inter-American Development Bank
IFPRI: International Food Policy Research Institute
IICA: Inter-American Institute for Cooperation on Agriculture
LAC: Latin America and Caribbean
LSMS: Living Standard Measurement Survey
MAGA: Ministry of Agriculture and Livestock
MAGA-SIG: Ministry of Agriculture Geographic Information System
MARN: Ministry of Environment and Natural Resources
MIRNA: Western Altiplano Natural Resources Management Project
Mr: Montana (land measure equal to 0.7 ha)
NGO: Non-governmental Organization
ODI: Overseas Development Institute
PRSP: Poverty Reduction Strategy Paper
RNFE: Rural Non-farm Employment
RTA: Regional Unit for Technical Assistance
SEGEPLAN: Secretariat for Planning
UNDP: United Nations Development Programme
USAID: United States Agency for International Development
VAM: Vulnerability Analysis and Mapping
WB: World Bank
WFP: World Food Program

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APPENDIX 1

Using an Asset-Based Approach to Identify Drivers of Sustainable Rural Growth and Poverty Reduction in Central America: Conceptual Framework

Paul B. Siegel (Consultant, World Bank and FAO/CP)

1 The findings of this background paper are used as inputs in the World Bank research project, Drivers of Sustainable Rural Growth and Poverty Reduction in Central America. See Siegel (2005).
1. Introduction

The Central American regional study, “Identifying Drivers of Sustainable Rural Growth and Poverty Reduction,” is part of ongoing efforts by the Environmentally and Socially Sustainable Development (ESSD) Department and Central American (CA) Department in the Latin America and Caribbean (LAC) Region of the World Bank to strengthen analyses and strategies for rural development, and to address fundamental policy issues and investment priorities. An objective of this study is to develop appropriate conceptual and analytical frameworks to understand how broad-based economic growth can be stimulated in rural Central America, and to apply the framework for country case studies. An asset-based approach has been adopted to guide the conceptual and analytical frameworks used for this study, whereby household assets are considered the “drivers” of growth. This background paper provides an explanation of the asset-based approach, including a review of literature.

1.1. Background

Major economic, political and social changes have taken place in Central America over the past decade. While these changes have led to some improvements in well-being and reductions in rural poverty rates, the region is still characterized by persistent and stark inequalities in assets and incomes and high numbers of poor (Tejo 2000; Morley 2001; Sauma, 2002; Franko 2003; de Ferranti and others 2004). Central American countries have long been characterized by dualistic agricultural sectors and pervasive rural poverty. A significant share of the poor can be found in rural areas and rural-urban migration continues to take place (Hereford and Echeverria 2003)\(^2\). Broad-based growth is constrained by unequal asset distribution. This inequality is most evident in terms of landholdings, but other key productive, social and locational assets are also unequally distributed (Attanasio and Szekeley 2001; de Janvry 2002).

Policy reforms in the Central American countries led to new opportunities in the agricultural sector, especially for production of export commodities. In fact, agricultural growth in the 1990s was largely driven by increasing prices of key agricultural exports and land expansion. Since the late 1990s, prices have fallen dramatically (notably coffee prices) and opportunities for further land expansion are limited. Furthermore, there is not much optimism for sustained commodity price increases in the near future, with many commodities experiencing negative price trends (FAO 2002). As a result, there has been perception of a crisis in rural areas. The rural crisis has been compounded by natural disasters such as Hurricane Mitch and recurring droughts which have increased vulnerability in agricultural-dependent rural areas (de Ferranti and others 2000; IADB 2000; Keipi and Tyson 2001; Kiesel 2001). Increased market and trade liberalization and

\(^2\) About 40 percent of Central America’s total population is rural, but the rural poor constitute an overwhelming majority of the total poor (World Bank 2002b). Migration has been an important strategy for many rural poor in Central America, accounting for much of the reduction in rural poverty during the 1990s (de Janvry and Sadoulet 2001). However, some of this migration to urban areas has merely contributed to increases in urban poverty, a spatial redistribution of poverty.
decentralization all have the potential to create conditions for growth over time, but these changes, including the Central American Free Trade Agreement (CAFTA), further contribute to uncertainty in the short-term.

Most vulnerable among the rural poor in Central America are those with small landholdings and landless farm workers living in ecologically fragile areas, such as hillsides and sub-humid drought-prone areas. Many of these areas lack basic transport, communication and social infrastructure. Households in such areas have limited assets and livelihood opportunities. They tend to have lower levels of education, larger families, and strong communal traditions and cultural values that are not well understood in the context of the market economy. They produce for subsistence or the local market and are often net purchasers of food. Their productivity has not kept pace with other sectors of the economy, and many see migration as their best opportunity to escape poverty. Traditional policy and market-based reforms cannot quickly resolve decades of structural limitations facing the rural poor, including highly unequal access to productive and social infrastructure and unequal asset distributions.

1.2. Need for new rural development perspectives in Central America

Governments and donors seldom understand what drives rural growth and poverty reduction. As a result they have little guidance on how they can formulate strategies and prioritize investments for the rural sector (Echevarria 2001a). The Latin America and Caribbean (LAC) Regional Rural Development Strategy (World Bank 2002b) and others acknowledge that new approaches are needed to conceptualize, analyze and operationalize strategies and investments to promote sustainable poverty-reducing economic growth in rural areas of Central America.

A central theme of this reappraisal is that agriculture cannot serve as the sole engine of poverty reducing growth in the rural economy, and that a more balanced and integrated multi-sectoral and spatial approach to rural development is needed. Such an approach should consider supply and demand linkages with non-agricultural activities in rural areas, along with rural-urban linkages and migration.

There is a need to recognize the “pluriactive” nature of the rural economy (de Janvry and Sadoulet 2000, 2001; Lanjouw and Feder 2001; Haggblade and others 2002). Furthermore, the heterogeneity of such factors as agro-ecological conditions, access to infrastructure and services, household assets and livelihood strategies, and formal and informal institutions, points to the need for more attention to sub-national areas and households within geographic areas. This requires improved geographic analyses that

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3 See for example: de Janvry and Sadoulet (2000, 2001); Echevarria (2001b); Ashley and Maxwell (2001); IFAD (2001, 2002); Valdes and Mistiaen (2001); USAID (2001, 2002); IFPRI (2002); Richards and others (2002); ODI (2003). There is also a World Bank-wide rural development strategy (World Bank 2002a).
4 The pluriactive nature of the rural economy refers to the multiple activities that take place in rural areas.
consider the heterogeneity of areas and households within areas.\textsuperscript{5} See table 1.1 for highlights of the World Bank’s new rural development strategy for Central America.

Four basic “paths” have been identified for reducing rural poverty in Central America (see de Janvry and Sadoulet 2000; de Janvry and others 2002; USAID 2002). A fifth potential strategy has also been identified; payments for environmental services (CCAD 2002).

- \textit{Agricultural path}: increased productivity and diversification to higher value enterprises. For both: a) commercially oriented small farmers (primarily household employment and income), and b) larger commercial farmers (owner operated with hired labor).
- \textit{Pluriactive path}: focus on off-farm economic activities (including labor on larger farms), and also attempt to generate basic food staples for home consumption.
- \textit{Social assistance path}: both formal and informal assistance including safety nets, transfers, remittances, special targeted programs.
- \textit{Exit path}: migration out of rural areas within country and outside country.
- \textit{Payments for environmental services}: rural residents would receive payments for activities related to natural resource management and environmental quality.\textsuperscript{6}

Despite challenges to agriculture and the need to promote non-agricultural activities in rural areas, many policies and investments that support agricultural growth also support growth of the non-agricultural rural economy. Investments in transport and communication infrastructure, education, health, and improvements in factor and output markets can help stimulate agricultural and non-agricultural activities in rural areas. Thus, it would be a mistake to lessen support for agriculture in the hope that the non-agricultural rural economy could, in of itself, be the engine of poverty reducing rural economic growth (Start 2001; de Janvry and Sadoulet 2001; Reardon and others 2001). Identifying synergies between agricultural and non-agricultural activities is key for rural development (see box 1.1).

\textsuperscript{5} See Jalan and Ravallion (1997); Hentschel and others (1998); Wilcox (1999); Bigman and Fofack (2000); IFPRI (2000); de Janvry (2002); de Janvry and others (2002); Demombynes and others (2002); Davis (2002).

\textsuperscript{6} Linking natural resource management with poverty reduction, rural residents would receive payments for activities such as watershed protection, management of protected areas, natural forest management, reforestation activities in erosion-prone areas, conservation of biodiversity, carbon sequestering, soil and water conservation. This strategy could be important for poor indigenous people living in remote areas that are environmentally sensitive. See Varangis and others 2003 for some examples of payments for environmental services in coffee growing areas in Central America.
2. Asset-based conceptual framework

The asset-based approach focuses attention on the productive, social and locational assets of households, with the understanding that the quantity, quality and productivity of their portfolio of assets determine the potential for long-term growth and poverty reduction (see Siegel and Alwang 1999; Deininger and Olinto 2000). As such, household assets are considered the “drivers” of sustainable growth and poverty reduction.

The asset-based approach can be used to explore relationships between assets, context, behavior, and outcomes (see de Janvry and Sadoulet 2001). The assets of a household are broadly defined to include the productive, social and locational assets that determine the opportunity set of options for livelihood strategies. These actions, in turn, determine outcomes in terms of household well-being. Of critical importance is the context, the policy and institutional milieu and the existence or absence of risks. The welfare-generating potential of assets depends on the interface between assets and the context. Thus policy reforms and the building of assets need to be considered in tandem, and integrated with risk management strategies (IADB 2000). The asset-based approach is well-suited for understanding and analyzing rural poverty in Central America because of the highly unequal distribution of assets, high exposure to natural, economic and social risks, and the ongoing economic, political and institutional reforms. Figure 1.1 presents the framework graphically.

Using an asset-based approach to understand and analyze the rural situation in Central America frames overall development strategies and specific policy and investment alternatives in terms of households’ productive, social, and locational assets; how they complement each other, and the specific interventions that can be taken to strengthen and protect their portfolio of assets in order to improve well-being. Given that agriculture can not serve as the sole engine of rural growth a more balanced spatial and multi-sectoral approach to rural development is needed.7 This requires a household-level (microeconomic) orientation toward identifying drivers of growth -- which is provided by the asset-based conceptual framework. The asset-based approach underlies the

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7 Heterogeneity of agro-ecological zones, access to infrastructure and services, formal and informal institutions, etc. between and within the countries indicates that area- or region-specific approaches are more appropriate.
livelihoods approach (Carney and others 1999) and has increasingly been advocated by numerous development agencies.8

Using the asset-based conceptual approach, drivers of sustainable rural growth and poverty reduction are evaluated by focusing on the assets and combinations of assets needed by different types of households in different geographical areas to take advantage of economic opportunities and improve their well-being over time. This study is not, for example, trying to identify particular enterprises such as cut flowers, broccoli, snow peas or sub-sectors that might stimulate growth and poverty reduction. Instead our approach can be useful to understand the type and combination of assets that are required by households to take advantage of a particular enterprise or development path.

2.1. Components of the asset-based approach

Assets

A household’s assets consist of the stock of productive, social, and locational resources used to generate well-being (see Moser 1998; Siegel and Alwang 1999; Rakodi 1999; Carney and others 1999; de Janvry and Sadoulet 2001).9 Household assets are broadly defined to include tangible and intangible resources drawn from individual, household, community, and national and global levels (see table 2). According to the asset-based approach, the poor are “asset-poor”; they have limited assets, hold assets with low returns, and/or are unable to exploit their assets effectively.

Household assets include tangible assets such as land and other natural assets, agro-ecological conditions, equipment and other physical assets, livestock, housing, financial assets, human capital and household composition. Intangible assets are also important, such as social capital and political rights, and the capacity and openness of institutions. In addition, community and regional assets such as infrastructure and access to it infrastructure affect livelihood opportunities and returns on other assets.

Most economic analyses focus on productive tangible assets and how they generate returns. One reason is that data for tangible assets are more easily collected and available. However, there is growing consensus that both tangible and intangible assets, and their interplay, are important, especially in the context of risk management. As noted by Narayan and Pritchett (1997), poverty analyses that focus exclusively on tangible household assets miss a large part of the “poverty puzzle”, by ignoring the community and social context.

More attention is now being placed on social, institutional and political relationships among households within and outside the community; such as gender relations, social ties and networks, social cohesion, empowerment, participation in organizations, and effectiveness of collective action (Moser 1998; World Bank 2002c).

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8 An asset-based approach to welfare reform in the United States has been proposed by Sherraden (1991).
9 Also see World Bank (2000); Attanasio and Szekely (2001); Wadsworth (2002); Winters and others (2002).
Physical and social infrastructure complement other assets and help determine the expected returns and the risks of these other assets. In addition, the location of infrastructure is considered to be a critical asset, because it influences the availability and accessibility of goods and services (van de Walle 2000a, 2000b).

There is considerable heterogeneity of households’ assets and livelihood strategies in rural areas of Central America. Differences in agro-ecological conditions have an important impact on opportunities and constraints for rural households, because they determine the potential for agricultural and activities linked to agriculture (FAO 2001). In many cases, agro-ecological zones are also highly correlated with other assets at the household, community and regional levels (see table 1.2). Areas with low agricultural potential and located in environmentally sensitive zones often have relatively higher proportions of indigenous populations and higher poverty rates, and/or constraints on income generating potential from assets because of high transaction costs related to remoteness (Pichon and Uquillas 1999; FAO 2001; World Bank 2002c; Wadsworth 2002).

The quantity and quality of assets determine household well-being and growth potential, for a given context. Certain assets are effective only if combined with others, and their sequencing can also be critical. For example, access to high-quality land has different implications for well-being depending on its location relative to markets and other infrastructure or on access to credit and high-quality inputs. Education has different implications for welfare generation depending on location, the functioning of labor markets and related institutions. The existence of good transport and market infrastructure is essential for successful adoption of agricultural technology, by lowering transaction costs and opening new trade opportunities. Other important determinants of asset productivity include the regulatory and legal systems, and social and political inclusion such as human rights. These characteristics are inexorably tied to the context.

**Context**

The distribution of assets among households and communities and their welfare-generating potential depend on the context (past, present, future), which includes exogenous and endogenous factors. The context consists of the institutions and policies that define ownership and acceptable use of assets, along with the risks that affect the welfare-generating potential of assets. The political, legal and regulatory context determines, to a large extent, how households’ assets can be managed to achieve well-being (de Soto 2000; Zezza and Llambi 2002).

A major factor affecting the context is how institutions at macro, meso, micro levels function, their degree of inclusiveness, and how they interact. Issues of governance are critical, and many new initiatives towards decentralization have been stymied by the

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10The historical context can not be ignored. Household and community assets have been shaped by history. For example, the pervasiveness of rural poverty in the Central American countries is largely the result of historical factors (see for example, de Janvry and Sadoulet 2000; Attanasio and Szekely 2001; Morley 2001; Franko 2003; Plataforma Agraria 2003; World Bank 2002c).
lack of governance capacity and skills. Incompetence and corruption are also widespread. Governance issues are important for area comparative advantage and competitiveness and are receiving more attention by development agencies (World Bank 2002c).

The issue of access to assets and to markets is also closely linked to the context, where the “rules-of-the-game” are set (e.g., human and property rights, rules and regulations that relate to social and political inclusion, and environmental quality standards and enforcement). See box 1.2.

Box 1.2. The mystery of assets

In a book called The Mystery of Capital, de Soto (2000) explains the “mystery” of the asset-context interface. “Capital, like energy is also a dormant value. Bringing it to life requires us to go beyond looking at our assets as they are to actively thinking about them as they could be. It requires a process for fixing an asset’s economic potential into a form that can be used to initiate additional production … [the] key process was not deliberately set up to create capital but for the more mundane purpose of protecting property ownership. … Although we use these mechanisms all the time, we do not realize that they have capital-generating functions because they do not wear that label. We view them as parts of the system that protects property, not as interlocking mechanisms for fixing the economic potential of an asset in such a way that it can be converted into capital. What creates capital in the West, in other words, is an implicit process buried in the intricacies of its formal property systems (p. 45-46).”

The risks to which rural households and their assets are exposed are also part of the context. Risks include climatic factors such as drought, flood and hurricanes, price risks (for outputs and inputs), lack of markets, human health risks, plant and livestock diseases and pest infestations, and risks associated with conflicts and crime affecting personal security (de Ferranti and others 2000; IADB 2000; Keipi and Tyson 2002; Kiesel 2001). The presence of risk often invokes a cost of risk management; this cost can include lower income due to risk avoidance behavior (opportunity costs) and risk-reducing activities (actual costs), and costs associated with coping activities. Risk also induces fluctuations in consumption which, by themselves, lower household well-being.

To a large extent, the context is shaped by factors external (or outside the control) of households. Domestic and international policies, institutions and markets, and forces of nature shape the context. On the other hand, households can invest in assets, and allocate their assets and select livelihood strategies in a manner that reduces risks associated with the prevailing context. Furthermore, important links between policies and risks exist, because policies and investments can either increase risk and exposure to risk, or help households better manage risk and vulnerability to poverty (Siegel and Alwang 1999; Anderson 2001; Varangis and others 2002; Siegel and others 2003). In addition, social protection and safety nets can help households manage risk (Lustig 2001; World Bank 2001; Devereux 2001). The general lack of risk management instruments for the

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11 An example of the asset-context interface is the issue of property rights for indigenous people and their access to natural resources. The larger society has historically decided on indigenous property rights, often denying them rights to capitalize on assets.
rural poor in Central America constrains their ability to protect their assets and to generate higher returns from their portfolio of assets.

Despite the low asset base of many rural poor households, there is still potential to assist them by: increasing the efficiency and use of their existing assets, increasing the productivity of their existing assets, providing them with additional assets, by protecting the assets, and different combinations of these options. This requires investments, policy and institutional reforms, and significant capacity building. It also requires time. The temporal dimensions and dynamics of asset enhancement and expansion need to be carefully considered in project planning.12 A critical part of this process includes enhancing and expanding human and social capital, whereby individuals, households and communities learn entrepreneurial and management skills to become empowered in the newly liberalized and decentralized markets and institutions (Siegel and Alwang 1999; de Janvry and Sadoulet 2001; Attanasio and Szekely 2001). See box 1.3.

Box 1.3. Why the poor are poor: Lack of assets and low asset productivity

Explaining why the poor are poor in Central America, Valdes and Mistiaen (2001, p.12) cite another study that states: “Most basically it is because they have few assets (both human and physical, including social capital) and also because the productivity of their assets is low. The assets are meager not only in quantity but also in quality (for example, low levels of schooling are usually combined with poor quality of schooling). The low productivity of assets results from a combination of government failures and imperfect of incomplete markets.” Valdes and Mistiaen (2001) claim that: “This taxonomy helps in guiding the analysis of rural poverty determinants by distinguishing those factors that contribute or constrain the building of the assets of the poor (education, demographics, land, and others) from those influencing the productivity of such assets (the incentive framework, financial policies, overall economic growth, and others). Traditionally the bulk of the literature on agricultural development and poverty in Latin America has emphasized control over assets (land in particular) as the key factor in explaining rural poverty. Why the “low productivity of assets” effect on rural poverty has been practically ignored in a region with such a history of poor policies is puzzling.” (emphasis by author)

Livelihood strategies

The “opportunity set” (options) for households to achieve different levels of well-being depends on the interface between assets and the prevailing context. Strategic management by a household of its asset portfolio to achieve preferred well-being outcomes defines its behavior or livelihood strategy (Ellis 1998; Carney and others 1999). Livelihood strategies include: land and labor use decisions, investments in education, migration, participation in social capital building and other asset allocations. Different economic and social activities require mobilization of different amounts and types of assets. Asset holdings determine the ability to undertake a given enterprise and the productivity of resources allocated to that enterprise, while the potential returns depend also on the context. See box 1.4.

12 For example, it is important to consider the short-term cash flow needs for projects that include investments in assets because returns can take time to materialize. Such is the case with investments in fruit orchards and livestock, for example.
The asset-based approach uses a “livelihood focus” in recognition that rural households hold a portfolio of assets and allocate these assets among a range of welfare-generating activities (Chambers and Conway 1992; Carney and others 1999). The asset-based approach helps us understand why and how households manage assets and risks to “select” certain livelihood strategies to achieve welfare outcomes; in the face of specific asset-context interface conditions (Wadsworth 2002).

Livelihood strategies of rural households in Central America include a wide range of on- and off-farm agricultural and non-agricultural activities as self-employed or laborers, and migration (temporary and permanent). It has been estimated that about 50% or more of rural households’ income in the Central American countries come from rural non-farm employment (RNFE) (Berdegue and others 2001; Reardon and Berdegue 2002; Corral and Reardon 2001). Many of the RNFE jobs are low-skill and low-paying jobs that are not obvious paths out of poverty. More attention needs to be devoted to understanding households’ asset portfolios and allocation of assets, particularly labor. For example, contrary to long held beliefs in the need for labor intensive agricultural technologies, many small farmers with limited land assets really would be better served by labor saving agricultural technologies to free up labor for alternative activities (USAID 2001; Reardon and others 2001; Start 2001).

The asset-based approach also focuses on the longer-term implications of short-term decisions about the allocation of assets. For example, coping strategies used by poor rural households can lead to the degradation or decapitalization of assets such as cutting down trees, taking children out of school and these actions can contribute to a cycle of poverty. Alternatively, household livelihood strategies can lead to improved asset portfolios such as investments in improved technology, training programs, empowerment in social and political networks that can lead to a virtuous cycle of sustainable growth. Asset accumulation and changes in livelihood strategies are important drivers for sustained improvements in well-being, and this study describes patterns of asset accumulation and livelihood strategies and investigates their causes.

Rural diversification, is not necessarily poverty reducing. In most cases there will be winners and losers, and those minimally affected such as remote communities that are semi-subsistent and autarkic). In fact, there is evidence that past diversification initiatives in Central America have been biased toward higher-potential areas and households with stronger asset bases (Tabora 1992). Diversification efforts targeted to lower-potential areas with high transactions costs such as those that are geographically remote and/or are characterized by disadvantageous agro-ecological conditions, lack of infrastructure, low
human capital might require relatively large per-capita investments in tangible and intangible assets, with relatively low returns in the short-term (Start 2001; Reardon and others 2001). This implies that national and local governments need the need explicit growth and/or poverty reduction objectives to carry out targeted investments effectively. It also implies the need to recognize potential growth-efficiency-equity trade-offs.

Outcomes

Ultimately, we are concerned with outcomes that reflect household well-being and prospects for growth over time. Household well-being is multi-dimensional, and some of these dimensions are admittedly very difficult to quantify and measure (World Bank 2000). Since income and consumption are more easily measured and generally correlate well to other indicators of well-being, they tend to be the primary indicators used, especially in the quantitative analyses. Non money-metric approaches can be found, but usually the indicators are tied back to the concept of poverty using a money-metric baseline (Glewwe and van der Gaag 1988).

However, different measures of well-being can be used to measure outcomes to reflect economic, social and environmental outcomes that can be material and/or non-material in nature. More attention is being devoted in the development literature to multi-dimensional economic, social and environmental measures of well-being (Mos 1998; Carney and others 1999; Coudouel and Hentschel 2000; Narayan and others 2000). Poor rural households are also concerned about food security, health status, vulnerability in general, empowerment and self-esteem, participation in community affairs, environmental quality, and hopefulness towards the future (Carney and others 1999; Narayan and others 2000). Such measures of well-being are not easy to obtain and quantify, necessitating the use of participative methods and qualitative analyses.

Poverty tends to be a transitory state for many households and there is a tendency to move above and below the poverty line. That is, many households are vulnerable to poverty because of changing asset-context conditions and livelihood strategies (Siegel and others 2003; World Bank 2001). Changes in well-being may be concentrated along certain points of the distribution of well-being (not just below the poverty line), and public policy should be designed to improve well-being for broad segments of society – not just those below or above the poverty line. Because of these factors, it is important to examine levels and changes in well-being along the entire distribution of rural households; including poor and non-poor households (Alwang and others 2002).

The asset-based approach leads us to consider a variety of measures of household well-being. It also leads us to use both quantitative and qualitative analyses to better understand the complex relationships between assets-context-behavior-outcomes. This is because we need to consider tangible and intangible assets and material and non-material

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13 In addition to outcomes related to household well-being, it is possible to use the asset base approach to consider how the asset-context-livelihoods interface generate other outcomes, such as environmental impacts that are external to the household’s well-being (e.g., down-stream pollution) but have an impact on social welfare and sustainability. This requires additional types of data and analysis.
measures of well-being, in addition to subjective perceptions about opportunities and risks and the selection of multiple livelihood strategies. More tangible outcomes are measures of income/consumption, savings, food security, and nutritional and health status. Intangible measures of well-being are more subjective, and include perceptions of self-esteem and empowerment, hope towards the future, and leisure and recreation.

3. Conclusion

The asset-based approach is an appropriate conceptual framework for organizing thinking about poor rural households in Central America, and for identifying drivers of poverty-reducing growth. The asset-based approach considers linkages between households’ portfolios of productive, social and location-specific assets, the policy, institutional and risk context, their behavior as expressed in their livelihood strategies, and outcomes in terms of well-being. For economic growth to be poverty reducing in a sustainable manner, it is critical to have a better understanding of household asset portfolios, and how assets interact with the context to influence the selection of livelihood strategies which, in turn, determine well-being.

Policy reforms can change the context and income-generating potential of assets. Investments can add new assets or increase the efficiency of existing household assets, and also improve households’ risk management capacity. Investment priorities and project design influence (and are influenced by) the sequencing and complementarity of changes in the asset portfolio. After all is said and done, a household’s asset portfolio will determine whether growth and poverty reduction can be achieved, and sustained over time.

The asset-based framework is amenable to different analytical techniques. It is suggested to combine quantitative and qualitative spatial and household level analyses (and linked spatial and household level analyses) to deepen understanding of the complex relationships between assets, context, livelihoods and outcomes. Combining quantitative and qualitative analyses can generate especially interesting insights.

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14 It is suggested to undertake the following analyses descriptive statistical and graphical analyses of the distribution of assets and incomes among households, GIS-type mapping techniques along with some simple regressions of spatial relationships, quantitative household analysis, participatory qualitative analyses of assets and livelihoods, and participatory qualitative assessments of existing CA ESSD projects.
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Table 1.1. Toward a New Rural Development Strategy for Central America

A recent World Bank report on rural development in Central America highlights the following strategies and actions to achieve poverty reducing growth in Central America (World Bank, 2002b):

- Need for “right” mix of policies, institutions and support programs to improve the investment climate
- Macroeconomic and trade policies, sectoral policies and programs, and good governance are key to competitiveness
- Agricultural growth is critical for rural development, but there are many non-agricultural rural activities that are critical for both agricultural and rural development
- Rural-urban dynamics and linkages, including migration need to be considered
- Need for a regional development perspective (i.e., “rural space approach”) based on a “new institutionality” with decentralization and more local participation, and the inclusion of marginalized groups
- Increased productivity, competitiveness and private sector development are (or at least should be) key engines of growth
- Need for efficient and equitable access to product and output markets
- Need to build human and social capital by expanding delivery of education, health and nutrition services targeted to the rural poor
- Need to broaden and strengthen risk management and to provide social assistance and safety nets for the poor and vulnerable
- Need to manage natural resources in a sustainable manner through better incentives, regulations, and enforcement
### Table 1.2. Household-Level Assets and Links to Other Levels

<table>
<thead>
<tr>
<th>Asset Type</th>
<th>Micro Level</th>
<th>Meso Level</th>
<th>Macro Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Household (HH) Level</strong></td>
<td><strong>Community and Local Level</strong></td>
<td><strong>Regional, National, International Level</strong></td>
</tr>
<tr>
<td>Natural</td>
<td>“Private” land, pasture, forests,</td>
<td>“Common” land, pasture, forests, fisheries, water</td>
<td>National and Global commons, rivers and watersheds, lakes, seas, oceans, air</td>
</tr>
<tr>
<td></td>
<td>fisheries, water: quality and quantity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human</td>
<td>HH composition and size</td>
<td>Labor pool</td>
<td>Labor markets</td>
</tr>
<tr>
<td></td>
<td>Health and nutritional status</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Education and skills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical</td>
<td>Productive assets (tools, equipment, work animals)</td>
<td>Productive assets (communal and private)</td>
<td>Productive assets (rental markets)</td>
</tr>
<tr>
<td></td>
<td>Household assets (e.g. housing, household goods and utensils)</td>
<td>Stocks (e.g., livestock, food)</td>
<td>Stocks (e.g., buffer stocks)</td>
</tr>
<tr>
<td></td>
<td>Stocks (e.g., livestock, food, jewelry)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial</td>
<td>Cash, savings, access to credit, and insurance markets</td>
<td>Cash, savings, access to credit and insurance markets</td>
<td>Finance and insurance systems Access to international finance</td>
</tr>
<tr>
<td>Social</td>
<td>HH social ties and networks</td>
<td>Community social ties and networks</td>
<td>Extra-community social ties and networks</td>
</tr>
<tr>
<td></td>
<td>Intra-household dynamics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location and Infrastructure</td>
<td>Proximity and access to water and sanitation, education and health, marketplace, storage, roads</td>
<td>Water and sanitation, schools, health centers, marketplace, storage facilities, roads Proximity to transport and communication infrastructure</td>
<td>Distance to markets, transportation, communication, information systems Health and education infrastructure</td>
</tr>
<tr>
<td>Political and Institutional</td>
<td>Participation in household decisionmaking (including power relationships related to gender and age)</td>
<td>Participation in community decision-making Governance Security of person and property</td>
<td>Political stability Political participation Effectiveness of collective action Governance Human rights and security of person and property</td>
</tr>
</tbody>
</table>

From: Siegel and Alwang (1999)
Figure 1.1. The Asset-based Approach: Assets, Livelihood Strategies and Well-Being Outcomes

**Assets…**

**…determine the opportunity set**

<table>
<thead>
<tr>
<th>Productive assets</th>
<th>Social assets</th>
<th>Location assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural resources (private and commons)</td>
<td>Social networks</td>
<td>Access to infrastructure and services</td>
</tr>
<tr>
<td>Human capital (education, skills, health status, household composition)</td>
<td>Political networks (human rights, participation in political decisions)</td>
<td>Distance to urban centers</td>
</tr>
<tr>
<td>Physical capital (equipment, housing, transport)</td>
<td></td>
<td>Agro-ecological zone (soil quality, climatic conditions)</td>
</tr>
<tr>
<td>Financial capital (savings, stocks of grains and livestock, access to credit)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Well-being outcomes … ↔ ↔ ↔**

<table>
<thead>
<tr>
<th>Income and consumption</th>
<th>Self-esteem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Savings</td>
<td>Leisure and recreation</td>
</tr>
<tr>
<td>Food security</td>
<td>Empowerment</td>
</tr>
<tr>
<td>Health and nutritional status</td>
<td>Environmental quality</td>
</tr>
<tr>
<td></td>
<td>Hopefulness about the future</td>
</tr>
</tbody>
</table>

**…..within a given context**

<table>
<thead>
<tr>
<th>Policies and institutions</th>
<th>Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macroeconomic and trade policies</td>
<td>Price and market risk</td>
</tr>
<tr>
<td>Sectoral policies and institutions</td>
<td>Droughts and floods</td>
</tr>
<tr>
<td>Political and market liberalization, decentralization, privatization</td>
<td>Natural disasters</td>
</tr>
<tr>
<td>Legal and regulatory systems, property rights and contracts</td>
<td>Diseases and pests of animals and plants</td>
</tr>
<tr>
<td>Human rights, labor laws</td>
<td>Human diseases</td>
</tr>
<tr>
<td>National and local governments and institutions</td>
<td>Physical insecurity</td>
</tr>
<tr>
<td>Private sector development in factor and product markets</td>
<td>Discrimination</td>
</tr>
<tr>
<td>Social protection and safety nets</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Livelihood strategies (behavior)</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-farm activities agricultural activities</td>
</tr>
<tr>
<td>Off-farm agricultural, non-agricultural activities</td>
</tr>
<tr>
<td>Commercial activities, microenterprise</td>
</tr>
<tr>
<td>Migration, receipt of remittances</td>
</tr>
<tr>
<td>Activities to strengthen social, environmental assets</td>
</tr>
<tr>
<td>Participation in social assistance and safety nets</td>
</tr>
</tbody>
</table>
APPENDIX 2

Spatial Analysis of Rural Economic Growth Potential in Guatemala\textsuperscript{15}

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David Woodall-Gainey (Consultant, Virginia Tech)
Paul Siegel (Consultant, World Bank/FAO-CP)

\textsuperscript{15} The findings of this background paper are used as inputs in the World Bank research project, Drivers of Sustainable Rural Growth and Poverty Reduction in Central America, Guatemala Country Case Study. The authors thank Jose Miguel Duro, Director of MAGA-SIG for access to the maps and data, and his most insightful comments and suggestions.
1. Introduction

Because of varied topography, limited road coverage and historical investment patterns that favored certain areas, economic opportunities in rural Guatemala are heavily influenced by geographic space. As with other countries in Central America, growth and development has been concentrated in areas where agro-ecological conditions are favorable for export agricultural products. Road networks and other infrastructure have been built to support production in coffee and banana-producing areas of Guatemala and Honduras, in coffee and cattle-producing areas of Nicaragua and in other high export-potential areas around the region.

Economic potential is also, in part, determined by spatial assets, and, as a result, the spatial distribution of human and physical assets is of interest to policy design. If physical and infrastructure assets contribute to economic growth, then growth-oriented investments should be targeted toward areas with more favorable natural assets. On the other hand, if poverty rates are higher in more isolated areas with less infrastructure and longer travel times to markets and population centers, then growth-oriented investments might bypass such areas, exacerbate regional inequalities, and increase social problems.

The spatial analysis is designed to address these issues and set the stage for a more in-depth analysis of determinants of growth in rural areas. It is descriptive in nature and is intended to provide an overview of the organization of the rural Guatemalan economy. We begin by showing the distribution of population compared to the distribution of transportation infrastructure. As expected, more densely populated areas are also those areas with better road and other forms of infrastructure. We compare these distributions with the spatial distribution of zones of economic growth potential as determined by agricultural potential and access to transportation infrastructure.

We also examine the spatial distribution of poverty and food insecurity to understand the relationship between population density, growth potential and these outcomes. Many of the areas with the highest proportions and densities of poor and food insecure households also have relatively good prospects for economic growth, indicating that there are not stark tradeoffs between area growth potential and potential for poverty reduction. However, despite this area potential, poorer households lack complementary assets that allow them to take advantage of economic opportunities. Furthermore, the aggregate nature of the spatial analysis can mask substantial intra-region differences in access to infrastructure. Because of these factors, the spatial analysis is complemented by an analysis of household-level assets in appendix 3.
2. **Data and methods**

Data for this analysis come from a variety of sources, with the major one being the Geographic Information System of the Ministry of Agriculture (MAGA-SIG\(^{16}\)). These data are supplemented with data from the 2002 population census and the vulnerability assessment conducted by MAGA and supported by the World Food Program (GoG/WFP 2002)\(^{17}\).

In some cases, new maps were created using standard geographic information systems (GIS) techniques. Maps were created by: a) overlaying variables, or b) generating new variables. An example of a map created by overlaying variables is the map generated by overlaying transportation infrastructure and population centers. An example of a new variable is the map of poverty density for which we used the existing poverty map, municipio-level area and municipio-level census data to generate a measure of poverty density (poverty rate x population/km\(^2\)). In some cases, we used the existing map (e.g., the WFP-VAM map of vulnerability to food insecurity). The map for agricultural potential at the municipio-level was prepared by the director of MAGA-SIG, Jose Miguel Duro, after consultations with the study team. This agricultural potential map was used to generate a map of “economic potential” by overlaying it with a road density map.

The GIS analysis was augmented by regression analyses of the determinants of population change by municipio from 1994 to 2002.

3. **Description of rural space**

Guatemala is politically divided into Departments (Departamentos), which in turn consist of a number of Municipalities (Municipios), and the National Statistics Institute has aggregated these into eight regions\(^{18}\) (figures 2.1 and 2.2). Guatemala City is the only population center whose population exceeds one million, but other population centers with more than 100,000 inhabitants are scattered around the country (figure 2.3).

The most densely populated areas are those surrounding the capital city and in the Western Altiplano (figure 2.4) moving toward the western border with Mexico. The Western Altiplano includes Northwest and Southwest Regions and is among the poorest areas in Central America. Areas along the Pacific Coast and along the Honduran and Salvadoran borders are also relatively densely populated as are a few Departments in the Northern Region. In Peten and the eastern coastal region, population densities lower than 80 people per square kilometer predominate.

\(^{16}\) See [http://www.maga.gob.gt/sig/](http://www.maga.gob.gt/sig/) for more information.

\(^{17}\) The population census and the vulnerability assessment are part of the MAGA-SIG data base.

\(^{18}\) We use the administrative regions here; later we examine differences by agricultural regions. The latter cross administrative borders, but are useful means of grouping by production patterns, livelihood strategies, and agricultural systems.
Road networks stretch westward from Guatemala City into the coffee-producing areas of Western Altiplano and south toward the productive agricultural areas along the Pacific Coast (figure 2.5). Another major road network runs eastward through the coffee producing areas near the eastern highlands and tropical fruit-producing areas of the eastern coastal plain. Areas of low population density in the North and Peten Regions are, as expected, underserved by transportation infrastructure; the Peten has only two significant road networks, and no roads exist northwest of Coban in the North Region.

Road density adjusted for population is a measure of access to markets that may be associated with economic growth potential. In Nicaragua, for example, the “Drivers of Growth” case study found that road density is an important determinant of economic potential and growth, and is generally concentrated in areas relatively close to Managua. In Guatemala, road access is highest in areas around Guatemala City and selected areas of the Western Altiplano (figure 2.6). The latter areas are coffee-growing and roads were constructed to provide access for the export of coffee. In contrast, the eastern parts of the country near the Atlantic coast have very low densities, in part due to their low population densities. An important contrast emerges in figure 2.6 where the northern half of Guatemala is seen to have very low road densities while the southern half has uniformly higher densities. This result mirrors the distribution of population where the northern half has much lower population densities than the south (figure 2.4). It also shows a possible growth constraint in the north due to lack of infrastructure.

Population change between the 1994 and 2002 censuses did not follow a regular spatial pattern; while areas near Guatemala City grew most rapidly, other high-growth municipios are spread around the country (figure 2.7 and table 2.1). The northern portion of the country experienced higher rates of population growth than the south, but the higher rate of growth is largely explained by lower population densities in the base year (1994). In the North, population grew most quickly in Alta Verapaz, while growth in Baja Verapaz was modest. Several municipios in the Peten grew rapidly, but these areas are comprised of frontier agricultural areas and the 1994 population base there tended to be very low (contributing to a high rate of growth). Most municipios in the Western Altiplano had population growth below the national average, and some experienced very low rates. In general, except for areas very near the urban center, the southern and eastern portions of the country experienced very low population growth rates between 1994 and 2002.

Population changes are caused by the natural rate of increase (births minus deaths) plus net migration. The natural population growth rate is not likely to differ significantly by region or department, but rural Guatemalans have a long history of internal migration (Comite Tecnico Interinstitucional 2002). Seasonal migration, where

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19 More description of agricultural production regions is found. In the text.
20 For details, see GoG/WFP, p. 30.
21 The poor generally have higher levels of fertility than the non-poor (Comite Tecnico Interinstitucional 2002), so that poorer areas are likely to have higher birth rates, but death rates are also likely to be higher as poverty grows. There is no known regional disaggregation of the natural rate of population increase for rural Guatemala.
families seek temporary work, usually in agriculture, is common, and destinations include the southern coast and eastern plantations. An estimated 800,000 to 1 million Guatemalans migrate on a seasonal basis each year (SEGEPLAN 2002). Permanent migration occurs as well, with the primary destinations being Guatemala City and Peten Region (Comite Tecnico Interinstitucional 2002). It is estimated that about 40 percent of total permanent migrants reside in Guatemala City (SEGEPLAN 2002). Regional urban centers also attract many migrants. These include Quetzaltenango, Huehuetenango, y Tononican (Western Altiplano); Antigua Guatemala (Central Region); Salama (Baja Verapaz); Puerto Barrios and Jalapa (East). Migrants to urban centers are generally employed in the informal sector, in maquiladoras, in construction and services. Migrants to Peten generally go there in search of agricultural land.

A regression of the determinants of population change sheds light on the sources of growth (table 2.2). Growth was highest in the more densely populated municipios and lowest in areas where the share of total agricultural land to perennials was highest. Population growth was also lowest in areas with the best potential lands. This finding might be explained by higher rates of titled land in such regions; while land quality is high, access to such land may be out of the reach of typical migrants. Both the finding about perennials and the finding about land quality can also explained by the coffee crisis: coffee regions generally have high quality lands and higher proportions of such lands planted to perennials. These regions also appear to have experienced out migration (or at least significantly lower rates of population growth).

4. Agriculture, economic potential and poverty

Information on agricultural potential combined with access to infrastructure is used below to create a map of economic potential. Due to the importance of agriculture and particularly newer agricultural export crops (World Bank 2004) to growth potential in rural areas, we begin by investigating how agricultural potential varies over space. The map of agricultural potential highlights the commercial agricultural areas of the Pacific Coast and the relatively high productivity areas of the Atlantic Coast (figure 2.8). The densely populated Western Altiplano has high slopes (and as a result, relatively lower productive potential), but relatively deep volcanic soils. This area is moderately productive, but does not have the same productive potential as the coastal regions. The Northern and Peten Regions have moderate to high productivity soils as do several areas in eastern Guatemala; however, as noted above, these areas have limited access to infrastructure.

Agricultural regions of Guatemala

A recent study conducted by the social science research group AVANSCO divides Guatemala into five agricultural regions (AVANSCO 2002). Each of these is comprised of sub-regions with different typologies of producers. The regions consist of

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22 This map was created with a composite of variables representing soil type and quality, soil depth and slope. Data are aggregated to the municipio level and the aggregation surely masks important intra-municipio heterogeneity.
the Western Altiplano, the Southern Coast, the East, Alta Verapaz and the Northern Lowlands (figure 2.9). The agricultural regions differ according to characteristics (density of population, land tenure, type of farm, etc.), according to products, and according to livelihood strategies (see table 2.3 for a description of the major characteristics of the regions). Significant variation occurs within the larger regions; for example AVANSCO divides the Western Altiplano into 16 sub-regions, including five coffee-producing subregions.

The Western Altiplano is characterized by small-scale (minifundio) farms producing subsistence crops, together with mixed subsistence-market orientation, and some wholly market-oriented producers of horticultural crops and coffee. While land tenure is relatively secure (mostly through traditional informal mechanisms) and land markets (e.g., land rental) function fairly well, there are problems with a progressive shrinking of land per household member. As population has increased, families have had to divide the land among their children who in turn divide it among theirs. The youngest adults find themselves facing land scarcity. This scarcity, in turn, induces adoption of alternative livelihood strategies including seasonal or long-term migration, especially abroad (see table 2.3). Many migrants from land-scarce areas in Western Altiplano move toward the Southern Coast, where they work on plantations and often rent small plots of land for their food needs. Others migrate internationally, many to Chiapas, Mexico, where they participate in coffee production and harvest.

Another problem in the Western Altiplano is the legal recognition of land. A significant number of farmers accessed land through communal property, based on the indigenous tradition of sharing resources. However, these lands can only be recognized at the communal level, in other words, farmers do not legally own the land which may hinder the ability to invest. There have also been some communal disputes over land and resources within a territory (such as water) which have resulted in violent confrontations.

The Southern Coast is dominated by large-scale export-oriented producers, together with minifundios. The large scale- export oriented industry is mostly dedicated to sugar cane and sugar production. It is among the most modern and organized industries in the country. It is also an important source of agricultural jobs in the country, employing nearly 120 thousand people (in 1994), many of whom are seasonal workers from the Western Altiplano and other Northern departments. Working conditions overall have improved in the last 20 years, with better salaries and infrastructure to house and serve workers. However, salaries can still be considered low for a very physically demanding job. The minifundios are linked to export crop production, such as bananas, other fruits, and coffee as well as the production of subsistence crops. Land tenure is relatively secure for minifundios and large-scale producers.

The Alta Verapaz region has relatively low population densities and a mix of small-scale and plantation farms. It is considered an agriculturally underdeveloped region with large amounts of uncultivated lands and a slow legalization process of small

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23 The vast majority of seasonal migrants in Guatemala come from the Western Altiplano (SEGEPLAN 2002).
farms. Slow legalization has resulted in squatting and some land invasions. In the larger farms, landless peasants have a right to cultivate subsistence crops in exchange for work, but conditions are poor as peasants have few other rights. Production in small and large farms is varied, ranging from coffee and cardamom, to forestry (under an environmental conservation law) and horticulture. Other small industries and livelihood strategies include handicrafts, dairy production and micro industry and migration.

The East is characterized by a mixture of subsistence, small-scale farms with market orientation and plantation agriculture. Local workers supply melon, banana and plantain plantations with seasonal and permanent labor. In addition, medium-large scale coffee producers and smaller-scale tobacco producers demand agricultural workers in the East. The area’s agriculture is well connected to internal and international markets; roads do a good job serving the areas in the East with highest agricultural production. There is also a significant number of minifundios dedicated to subsistence crops, especially in the southern part of this region. Land tenure among these farmers is uncertain and land invasions and squatting are not uncommon. Land conflict is not as acute as in other parts of the country.

The Northern lowlands are comprised mainly of the Department of Peten, a frontier agricultural area with abundant natural resources and limited infrastructure. In the 1950s migration into this area was encouraged by the central government. This migration was not a part of a planned process and land grabbing soon followed. Land grabbing persists today and has resulted in uncertain land tenure and security. Municipalities, cooperative and associations of farmers were allocated land for cultivation and exploitation, but often municipality limits, land plot boundaries and rules of land use are ignored. This has created overexploitation of land, which is largely not suited for (traditional) agriculture. Deforestation and overuse of lands threaten protected areas.

By and large, farmers produce subsistence crops along with some cash crops and cattle, depending on land availability. Isolation and lack of infrastructure have prevented the growth of an export-oriented agriculture. There are two potential resources that are yet to be fully exploited: a forestry industry (based on sound management of natural resources) and tourism.

**Economic potential and poverty**

There is no systematic methodology or consistent set of variables used to map economic potential zones in rural areas (Rodriguez and Thomas 1998). Others generally use at least two variables to identify rural economic potential zones. For example, Pender and Hazell (2000) use two variables – one representing agricultural potential and the other representing access to infrastructure and markets – to generate a classification of more and less favored areas. A report prepared for the Government of Nicaragua use three factors: agricultural potential, climatic risk and access to services (Arce, Budinich and Ubila 2002).
A rough measure of economic potential was generated by overlaying the map of agricultural potential (figure 2.8) with the map of road densities (figure 2.6) and is shown in figure 11\textsuperscript{24}. The methods used to generate this map are shown in table 2.4. Zones of high economic potential predominate in the South Coast, in scattered areas of the Western Altiplano, near Guatemala City and in the East, particularly along the Salvadoran border.

The map of extreme poverty shows that poverty rates are only weakly associated with lack of access to transportation infrastructure and limited agricultural potential (figure 2.12). The highest poverty rate municipios are found in the remote areas of the Western Altiplano, in the larger municipios in the Northern Region and in scattered border regions along the Honduran and Salvadoran borders. These areas are all relatively low in road density and also have limited agricultural potential, but there is some overlap between high poverty high potential areas in the Western Altiplano and the East. Poverty rates are much lower along the Pacific Coast, around Guatemala City and in Eastern Guatemala approaching the Atlantic Coast. While the latter areas have relatively low road densities and at best medium “agricultural potential,” people there have enough opportunity (particularly land) to be able to reduce their poverty. Areas southwest of Guatemala City all have extreme poverty rates of below 10 percent; the combination of good infrastructure access and high agricultural potential appears to be reducing poverty.

High poverty areas along the Honduran and Salvadoran borders in southeastern Guatemala represent somewhat of a conundrum. Despite good “spatial” conditions, measures of well-being are lagging far behind potential. These areas have relatively high access and agricultural potential, but also relatively high rates of poverty. These areas might be targeted for high labor demand investments (inside and out of agriculture). Some areas in the Western Altiplano fall under similar conditions; decent infrastructure access and good lands, but high rates of poverty. As is noted in the livelihoods studies, the mountains in the Western Altiplano leave many people almost completely isolated even though transportation access is, on average, quite good. Intra-regional heterogeneity is masked by the municipio-level analysis.

Although population densities decline as we move away from Guatemala City, the densities do not decline at as fast a rate as the poverty rate increases. Poverty densities (the number of extremely poor people per square kilometer) are highest in the Western Altiplano, in the areas around Quetzaltenango and Huehuetenango and moving west toward the Mexican border (figure 2.12). These areas also have very high poverty rates and the geographic correspondence between high poverty rates and high poverty density\textsuperscript{25} means that there is little or no tradeoff in targeting high poverty areas for poverty-reducing interventions. These are also areas identified by WFP as being the most vulnerable to food insecurity (see figure 2.13).

\textsuperscript{24} A potential drawback associated with this map is the notion of combining natural assets (agricultural potential) with man-made assets (road densities). Because of this combination, economic potential, as we define it, is a product of historical investments and can be changed through investments in infrastructure.

\textsuperscript{25} And, by inference, high population density.
The Western Altiplano is an obvious target for poverty-reducing investments, and is especially promising because of its relatively good economic potential. The combination of high population densities, relatively good infrastructure and good soil quality shows that the area has economic potential. Persistent high rates of poverty, however, show that this potential is not being tapped and that to the extent that it is being tapped, the poor are not able to participate. Despite high road densities, internal distances within these topographically complex municipios may limit participation in the market economy and cause high levels of poverty. Alternatively, asset bases of the poor in this region (land, capital, human assets) might need to be strengthened before they can benefit from growth-related spillovers. This descriptive analysis suggests that more needs to be known about human and other assets in order to design appropriate interventions.

Low population densities along the Honduran and Salvadoran border region lead to much lower poverty densities than those in the Western Altiplano. Here we witness a tradeoff between poverty rates and poverty densities. Because of the high poverty rates in some of these municipios, a project or investment need not have an explicit targeting mechanism; leakages to the non-poor are reduced in areas with higher rates of poverty. On the other hand, because population densities are low, the projects should be spatially targeted to specific population clusters, or the investment/program should be selected based on low costs of delivery over space. Investments like health clinics should be targeted to population clusters (as is the practice for health clinics to serve more than one community remote areas with low population density). Others, such as schools should be placed to guarantee a reasonable standard of access, even in low population density areas; our analysis indicates that the number of schools per capita tends to be highest in the most remote areas).

Agricultural development programs such as land titling and distance delivery of technical assistance services might also be appropriate in low density areas because they can be delivered across space at a minimal cost. Such programs might also be appropriate due to good agricultural potential and infrastructure in these areas.

5. Summary of findings

Economic potential has a strong spatial pattern in Guatemala, with high potential areas close to the capital city, along the Pacific Coast and in other areas with favorable soil and road conditions. Due to the high density of roads and favorable agroclimatic conditions in the southern part of the country, growth potential there is high. This finding hints that a differential development strategy might be appropriate. Northern areas have less access to infrastructure and growth strategies might be more inward looking there than in the more favored southern areas.

Population growth patterns have not followed expected patterns of economic growth; high economic potential areas have not, in general, experienced greater population growth from 1994-2002. Some areas of high agricultural potential are actually growing much more slowly than the national average, suggesting that access to
productive resources in these areas may limit opportunity and stimulate migration out of these regions.

Poverty rates and poverty densities overlap for a large portion of the areas indicating that programs targeted to high poverty rate areas will reach a large number of poor households that are also highly vulnerable to food insecurity. This overlap highlights the desirability of targeting growth and poverty-reducing investments toward the Western Altiplano. And also consideration of safety nets (e.g., feeding programs for school children). This area was also shown to have good growth potential, so additional analysis is needed to understand why so many households in a favorable region remain poor.

Land distribution and allocation remains a great challenge to poverty reduction in Guatemala. As most of the rural population is dedicated in one form or another to agriculture, the patterns of diminishing land resources and high concentration of land in a few hands are worrying. In the Western Altiplano, land is becoming scarce as the population grows; in the Southern Coast, sugar plantations concentrate holdings in the hands of few and salaries for agricultural workers remain low; in the Alta Verapaz region, some of the causes behind the armed conflict, such as the high concentration of land in a few large farms, are still the rule; in the East small landholders only have access to land of the lowest quality land; and in the North, land allocation is arbitrary and at the expense of forests. While there are major differences across regions, the central problem remains. That is, small landholders -- who are also the poorest households -- do not have enough land to engage competitively in agricultural production and engage in low return agricultural and non-agricultural activities.
References


Table 2.1. Population change by Region and Department, 1994-2002

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Table 2.2. Determinants of municipio-level changes in population (regression results)

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Source: Regression results.
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<th>Main products</th>
<th>Livelihood strategies</th>
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<tr>
<td><strong>Western Altiplano</strong></td>
<td>Small holdings &amp; sub-division of parcels Private land ownership Some commercialization, particularly in horticulture areas Substantial amounts of contract agriculture, particular in export-oriented production Heterogeneity &amp; diversified livelihood strategies</td>
<td>Maize &amp; beans, coffee, potatoes, horticulture (for domestic and international markets), deciduous fruits</td>
<td>Subsistence production Off-farm labor supply Micro-industry Petty trading Migration (internal &amp; international) Migration and land renting</td>
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<tr>
<td><strong>Southern Coast</strong></td>
<td>Large-scale, commercial producers Use of seasonal contract labor Some small-scale producers (many in coffee-banana areas) Some land redistribution efforts Private land ownership</td>
<td>Sugar cane, coffee, banana, African palm, livestock, rice (small-scale), maize &amp; beans (small-scale), tobacco (small-scale)</td>
<td>Mixed subsistence farming with off-farm labor supply Some petty trading Permanent employment on plantations International migration Fishing (subsistence &amp; market-oriented) Micro-industry (textiles, ceramics, dairy production)</td>
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<td><strong>Alta Verapaz</strong></td>
<td>Small-, medium- and large-scale agriculture Low population densities and relatively large holding sizes Diversified production systems depending on location Cooperative farming in coffee &amp; cardamom producing areas Some squatters on plantations</td>
<td>Coffee, cardamom, maize &amp; beans, horticulture (for domestic and international markets), poultry, small-scale livestock, extensive livestock (polochic valley), rice (large-scale), cacao</td>
<td>Subsistence production Land renting (and production on rented land) Small amounts of off-farm labor supply (to plantations) Micro-industry (dairy production, handicrafts) Migration (internal and international)</td>
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<tr>
<td>Region</td>
<td>Main characteristics</td>
<td>Main products</td>
<td>Livelihood strategies</td>
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<tr>
<td>East</td>
<td>Large-scale mixed with small scale agriculture Generally low population densities Substantial amounts of contract agriculture, particular in export-oriented production of horticultural crops Plantation agriculture producing banana, palm, oil, some rice Irrigated melon production with 3 crops per year in some areas Some large-scale livestock farms Exposure to flooding and hurricanes is relatively high in low-lying areas</td>
<td>Basic grains, maize &amp; beans, dairy, horticultural products, tobacco, coffee, plantain and banana, small animals, African palm, melons, livestock, tropical fruits and citrus, pineapple, some small-scale sugar cane</td>
<td>Subsistence production Small-scale production of market and export crops Land renting (and production on rented land) Labor supply to plantations (banana, melon, plantain), to medium-large coffee growers and to small-scale tobacco producers Micro industry (shoe making, dairy, forest-based handicrafts) Petty trading Migration to Guatemala City and internationally</td>
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<td>Northern Lowlands</td>
<td>Frontier agriculture; extensive land use Medium and large-scale farms Uncertain tenure in many areas Significant amounts of protected areas, but problems of environmental degradation are widespread Oil production</td>
<td>Basic grains, livestock, short-cycle horticultural crops, forestry, small amounts of coffee and cardamom</td>
<td>Subsistence production Mixed agriculture/forest exploitation Off-farm employment (oil industry &amp; tourism) Little to no export agriculture</td>
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Source: Adapted from AVANSCO 2002
Table 2.4. Method used to produce map of zones of economic potential

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<th>Road Density (grouped into 3 zones)</th>
<th>Economic Potential Zone (grouped into 3 zones)</th>
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Figure 2.1. Map of Guatemala
Figure 2.2. Guatemala's Regions and Departments

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Figure 2.3. Transportation infrastructure and population centers

Source: Drivers of Growth team and MAGA-SIG
Figure 2.4. Population densities

Source: Drivers of Growth team using data from Census of Population and Housing, 2002
Figure 2.5. Agricultural land use

Source: MAGA-SIG.
Figure 2.6. Population-adjusted road densities

Source: MAGA-SIG.
Figure 2.7. Population change, 1994-2002

Figure 2.8. Agricultural potential

Source: Drivers of Growth team and MAGA-SIG.
Figure 2.9. Agricultural Regions of Guatemala

Source: Drivers of Growth team with information from AVANSCO (2002).
Figure 2.10. Economic potential

Source: Drivers of Growth team.
Figure 2.11. Poverty rates

Source: MAGA-SIG
Figure 2.12. Poverty densities

Source: Drivers of Growth team using data from MAGA-SIG and the Census of Population, 2002.
Figure 2.13. Vulnerability to Food Insecurity

Source: MAGA-SIG, VAM analysis
APPENDIX 3

Household-level Analysis of Well-being in Rural Guatemala

Jeffrey Alwang (Professor, Virginia Tech)

The findings of this background paper are used as inputs in the World Bank research project, Drivers of Sustainable Rural Growth and Poverty Reduction in Central America, Guatemala Country Case Study. The author thanks Paul B. Siegel, Francisco Pichon, Martin Raine, Hans Jansen, Felipe Jaramillo and Bob Schneider for helpful comments.
1. Introduction

The purpose of this appendix is to provide details on methods and findings of the household-level analysis conducted in support of the Drivers of Sustainable Rural Growth and Poverty Reduction Guatemala case study. It employs an asset base approach to understand which assets and combinations of assets affect strategies (e.g. employment choices) and outcomes (e.g. household well-being). It also examines the determinants of household strategies and how the strategies interact with the context to determine overall area poverty reduction and growth potential.

According to the asset-based approach, assets, together with the context, influence behavior, and all three affect the ultimate outcome. Behavior refers to household responses to existing asset bases and the context; these responses include asset allocation, such as labor use decisions and investments for the future. In rural areas, household responses to the context include short and longer-term decisions about use of agricultural lands, dedication of existing family labor to on- and off-farm activities, and longer-term investments in human capital through participation in schooling. Livelihood strategies and investment decisions influence the future household asset position and determine static levels of well-being.

Bundles of assets may have synergistic impact on well-being (e.g. Alwang 2003). For example, human capital assets may be more highly rewarded in certain settings (depending on location-specific assets) or land of a given productivity may yield higher returns based on location or the presence of physical and human assets. Findings of asset complementarity and asset bundling were a major feature of the Nicaraguan Drivers of Growth study (World Bank 2005), but little evidence exists on their impacts in other Central American settings. Information about how asset combinations affect well-being is of critical interest to policy makers: efforts to improve land holding, for example, may only be successful in the presence of location assets such as access to infrastructure, markets and technical assistance. Land holding may yield higher returns to better-educated farmers, and in such cases, land redistribution might be combined with adult education programs or redistribution should target at least some better-educated farmers.

2. Methods

The analysis includes descriptive statistics, graphical and multivariate techniques. We provide descriptive statistics on asset levels, role of assets in determining poverty, and the distribution of assets by region. Graphical descriptive techniques include kernel density smoothing to examine the full distribution of well-being. A density reweighting experiment is conducted to examine how changes in levels of educational attainment affect the entire distribution of household well-being. A variety of statistical techniques is used to analyze the relationship between space, assets, and poverty-reducing growth potential.

The descriptive analysis guides the more quantitative statistical analysis which includes parametric analysis of determinants of levels of well-being. This parametric
analysis identifies the key assets and examines if they vary by region and by distances to markets and population centers of different sizes. A simple decomposition technique breaks regional differences in mean well-being down into differences attributable to mean asset levels and those due to returns to assets. We use these findings to simulate changes in key assets to determine how well-being will change with investments/changes in key assets. We then examine the impacts of asset accumulation and livelihood strategies: how choice of livelihood strategy, together with the household asset base determines well-being.

Multivariate analyses have the advantage of separating the effects of specific assets (such as education or land owned) on an outcome while holding levels of all other assets constant. Important caveats must be considered when interpreting these results. Often it is difficult to infer causality—for instance, when we find a positive association between participation in social capital activities and household well-being, we cannot immediately conclude that increased social capital will improve well-being. It may just be that better off people are more likely to participate. We note these issues of causality where appropriate and try to interpret the strength of the causal findings. When possible, we use instrumental variable techniques to verify the strength of the causal inference (see box 3.1).

Data sources

The primary data source for the household analysis is the ENCOVI (2000) comprehensive survey of 3852 rural households. The household survey includes 18 sub-sections covering housing attributes, social capital, household composition, health, consumption expenditures, income sources and employment, physical and financial assets, farm assets and farming practices. The survey data are representative at the level of 8 Regions (see appendix 2 in this volume) and for urban and rural areas within the region. The smallest geographic unit in the survey is the segmento compacto which is analogous to the census tract used by the U.S. Bureau of the Census. At times, segmento compacto level means of key variables are used as instruments. Geo-referencing is possible, however, only at the municipio level and any area-specific matching of household-level data with other sources is done at the municipio level. A complete description of the data is found in World Bank (2004).

The household data were augmented with data from various sources including the MAGA-SIG data bases, the Census of Agriculture (2003), and the Censuses of Population (1994 and 2002).

The quantitative analysis uses a money-metric measure of well-being. Money-metric approaches allow quantification of differences in well-being and allow consistent comparisons to be made across subgroups of households. Money-metric approaches also can be used to quantify the degree of inequality among household groups. Non money-metric measures of well-being include measures of access to social services, qualitative assessments, and participatory assessments. Non money-metric approaches can provide rich detail about rural households, the conditions they face, and non-financial dimensions
of their conditions. They recognize that overall well-being is a social state that cannot often be defined in terms of dollars alone. The qualitative studies which form the basis of appendix 4 in this volume employ primarily non money-metric measures.

The main money-metric measures are income and consumption expenditures deflated to reflect differences in needs across households. Because of seasonal fluctuations and the inherent difficulty in measuring agricultural incomes, consumption is preferred to income as a consistent measure of household welfare in rural areas. Evidence shows that in most countries, consumption expenditures are preferred over income as measures of well-being (Ravallion 1992; Deaton 1997). The value of consumption was computed using information on household food consumption, spending on goods and services, spending on household services such as energy and water, the annual use value of housing, an imputed value of durable goods, and miscellaneous costs such as health, education and others. Values were adjusted for regional variation in prices using regional price indexes. Household consumption expenditures were adjusted for household size differences by dividing the value by the total number of household members. Our main measure of well-being is, thus, per capita household consumption expenditures (see Sobrado 2004, for more information).

3. Descriptive analysis of well-being, space and assets in rural Guatemala

Descriptive statistics for the variables used in the household analysis are presented by household poverty status in table 3.1. Ownership of many assets varies by household poverty status and by region of residence (table 3.2). Household strategies and outcomes, such as employment patterns, well-being, and poverty status also vary by region of residence (table 3.3), lending support for conclusions about the need for spatially differentiated rural strategies.

Regional distribution of well-being

The distribution of well-being in rural areas provides more information than simple mean levels of consumption or poverty rates shown above. Information is gained on household vulnerability to poverty is gained by examining the full distribution of well-being. Clustering of households near (but above) the poverty line indicates that small declines in consumption can lead to relatively large increases in measured poverty. The distributions (that is, the density-or percentage- of households at each level of well-being) help describe local growth potential. Regions with large proportions of people just above the poverty line and few far above the poverty cutoff will likely have fewer demand-driven growth linkages than those with higher percentages of people well above the poverty line.

Estimates of the difference between each Region’s density of well-being (the distribution of consumption per capita) and the density for all rural areas are shown in figure 3.1. The well-being densities in the Metropolitan, Northeast and Central Regions 27

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27 Non-parametric Kernel density smoothing techniques are used to create these density differences (see Alwang, Mills and Taruvinga 2002, for more details). The density differences shown in figure 3.1
are centered to the right relative to that of the overall rural density. This rightward position indicates that the density is higher at better-off levels of well-being: relatively more households are better off in these Regions compared to the entire rural population. In particular, the Metropolitan density is sharply lower (the density difference is negative) below the poverty line and sharply higher above (to the right of) the line, indicating proportionately much fewer households below the poverty line and much more above it compared with the entire rural sample. The differences for the Northeast and Central regions are less pronounced, but for each of these, we see smaller densities far below the poverty line and larger ones far above the line. Differences in poverty rates alone do not adequately describe the degree of difference in the distribution of well-being between regions.

In contrast to these regions, the North, Northwest and Peten distributions of consumption are generally centered to the left of the entire rural sample. Relatively more households are found at lower levels of well-being and relatively fewer at higher levels. The North and Northwest differences are especially stark and reflect the high rates of moderate and extreme poverty in these regions. The pattern in Peten is revealing. In Peten, the distribution is more clustered around the poverty line; lower proportions of very bad-off households are found (the difference is negative at very low levels of consumption per capita) and there are slightly smaller proportions of households along a wide range of consumption above the poverty line. The Peten distribution is more compressed than that of the entire rural sample, meaning that general improvements in well being are likely to lower poverty substantially there. The shape and position of the density of well being for Southeast and Southwest Regions are similar to that of the entire rural sample.

These density differences are descriptive; it is difficult to know with certainty how well being will change in any region as a result of policy or other changes. However, they suggest substantial differences in the distribution of well-being by region. These differences help determine both prospects for growth and impacts of growth on poor and near-poor families. Small increases in mean well-being in Peten, for example, are likely to have a fairly large impact on poverty reduction because more households are clustered around (below) the poverty line. Metropolitan region has relatively more households clustered above the poverty line. Vulnerability to poverty is more pronounced; a small decline in mean well-being in the Metropolitan rural region is likely to raise poverty levels substantially. In the analysis that follows, we examine the determinants of mean levels of well-being.

4. **Assets and levels of and changes in well-being**

The association between asset ownership and levels of poverty and the strong spatial patterns of well-being and asset ownership described in appendix 2 suggest that

represent the difference in the density (roughly, the proportion of households in each bin along the distribution of well being) between the entire rural sample and each rural Region. Where values are positive (above the horizontal line), proportionally more rural households are at the corresponding level of well being compared to the entire rural sample.
assets and their ownership help determine levels of well-being and growth potential. These relationships are examined more closely through multivariate statistical analyses, which help measure the impacts of specific assets on mean household well-being, holding levels of other assets constant.

**Determinants of well being and poverty**

We begin our investigation by regressing consumption per capita (well being) on basic assets controlled by the household. These assets encompass the broad classes identified and discussed above (human capital, financial and physical capital, natural, spatial capital and social capital). The basic model is:

\[(A.3.1) \quad \ln C_j = f( X_j, Z_j)\]

where \(C_j\) represents per capita consumption for household \(j\), and \(X\) and \(Z\) represent vectors of household-specific and location assets. The \(Z\)-vector contains, in some cases, regional dummy variables, census segment-level means of variables (such as participation in social capital-building activities), and municipio-level variables representing means of variables (such as population change, etc. by municipio). The function \(f(.)\) is a generic functional form. We use a linear form to estimate (A.3.1), but include several variants at different parts of the analysis. We allow interactions between some of the asset variables (to measure the strength of asset complementarity).

This is a simple model of production of household well being as reflected by levels of consumption expenditures. The idea is that higher levels of assets will produce higher levels of household well-being. Assets that are especially significant or have an especially powerful effect may be targets for strengthening interventions.

Results for all rural areas are shown in table 3.4. Two variants of the model are shown: the first two columns present results with just exogenous assets; the second two columns show results when the income-generating strategies are included as regressors. These strategies are endogenous to the well-being generation regime (see box 3.1), but we include them to provide a sense of how household well-being and the household income-generation strategy are conditionally related. The regression coefficients indicate the percentage change in household consumption per capita given a one-unit increase in the asset in question, holding levels of other assets constant. The coefficients in table 3.4 all have the expected signs, and significance levels are quite high. Tests of model misspecification indicate no serious problems. In fact, quantile regressions, which are less sensitive to data outliers and model misspecification, yield virtually identical results\(^28\).

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\(^28\) These results are available from the author.
Basic assets are, as expected, important determinants of mean household-level well-being. Household structure, education, ethnicity, access to public services and distance from key facilities all help explain variation in well-being. Participation in social capital-building activities is also positively associated with well-being. Higher household dependency (number of dependents divided by number of workers in the household) is strongly related to lower levels of well-being; a one-percent increase in the dependency ratio leads to about a .25 percent decrease in household mean well-being. Male-headed households are, on average, 22 percent worse off than female-headed households; this difference is consistent with other findings from Guatemala (e.g. Hereford and Echeverria, 2003), but distinguishes Guatemala from the rest of Central America, where female-household headship is generally associated with lower well-being.

29 Here, the issue of endogeneity rears its ugly head (see box 3.1). Every one of these variables except for ethnicity might legitimately be argued as being endogenous to consumption. For example, less well off households might demand more children than better off households, and as a result the causal relationship between lower dependency and higher well being might be suspect. We recognize this possibility but are fairly confident in saying that policy levers to lower dependency (such as birth control or family planning education) will improve household well being in fairly short order.

30 We conducted similar regressions using census segment-level means of these participation variables as instruments and the results were qualitatively identical. See the final two columns of table 3.4 for these results. They suggest, in fact, that the spatial density of better educated household heads has a stronger impact on household well being than the level of education of the individual head.

Box 3.1. Endogeneity and causality in the regressions

Issues of exogeneity and causality are difficult to sort out in regressions of this sort. The problem is one of theory and inference: we wish to know, for example, if an increase in education of the household head will lead to an increase in household well being, all other assets held constant. If education level and well being are endogenously determined, if the model is missing variables affecting both education and well being, or if errors in measurement of education levels are correlated with the error in equation A.3.1, then problems emerge. Essentially, the parameter from the regression will be a biased estimate of the true (theoretical) relationship between education and well being. As a result of this bias, we can not be sure if a policy to improve educational attainment will improve well being.

We address this bias in several ways when conducting the analysis and in interpreting the coefficients. When possible, we use instrumental variables, usually in the form of census segment-level means of troublesome variables. We compare results of non-instrumented variables with those of instrumented variables to help gauge the degree of bias.

However, given the nature of the decisions and outcomes being modeled, it is impossible to sort out all the potential problems of endogeneity. In cases where endogeneity is still suspected to be a problem, the interpretation of the coefficients becomes one of a conditional relationship between the right- and left-hand side variables rather than one of theoretical causality. We mention these cases where appropriate.
Ethnicity of the household head is an important determinant of levels of well-being and poverty; indigenous rural households have mean levels of consumption that are about 30 percent lower than non-indigenous households. This finding holds across all regions of the country (see below) and is an important indication of disadvantage among indigenous households. Even controlling for levels of education and other tangible and productive assets, indigenous households have access to fewer opportunities than the non-indigenous. Below, we examine this finding in more detail to try to understand whether rural labor markets discriminate based on language and find that, while inability to speak Spanish also lowers household welfare, even controlling for language, indigenous households are worse off than ladinos.

Of assets most commonly associated with public investments, education, access to electricity and distance from the post office all help explain differences in household well-being. Living in a household headed by someone with some primary education is associated with 14 percent higher mean consumption per capita (compared to households headed by a person with no education), but the payoff to secondary school is even greater. Holding other assets constant, households headed by someone with secondary or higher education have mean levels of well being that are 46 percent greater than the comparison group (headed by someone with no formal education) and 27 percent higher than those headed by someone with primary school education. Thus, education has a particularly strong impact on mean household well being in rural Guatemala.

Electricity access similarly had a strong positive impact on consumption expenditures. Households with electricity are 24 percent better off than those without electricity. Internal remoteness is also important: a one percent reduction in the physical distance from the nearest mail services is associated with a .05 percent increase in household well being.

The dummy variables representing region of residence provide information about sources of inter-region differences in well being and poverty noted above. Households in the North, Northwest, Southeast and Southwest are all significantly worse-off (the coefficients are interpreted as the percentage difference from the comparison group) than households in the rural Metropolitan region, holding other assets constant. Differences in mean well being in these regions must be related to some uncontrolled factor, such as soil quality or agro-ecological factors, economic infrastructure, land access, or unmeasured institutions. Households in the Peten Region, where indicators of well being (seen above) are not good, are only about 15 percent worse off than those in the Metropolitan region. Thus, observed differences in well-being and poverty between the Peten and Metropolitan regions are mainly due to lower asset holdings in Peten.

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31 Causality can be questioned here, but to the extent that electricity is randomly assigned to areas, we feel confident saying that its provision does raise household-level welfare. When segment-level means were used, the results still showed strong statistical significance.
32 Other measures of internal remoteness, such as distance from banks and market centers, were examined and the results are virtually identical to those reported here.
33 They could also be interpreted to reflect the influence of region-level differences in unmeasured factors such as rural institutions.
Below we examine in more detail how livelihood strategies contribute to well-being outcomes, but livelihood choices are clearly associated with differences in rural household well-being\(^{34}\) (the third and fourth columns of table 3.4). Primary dependence on agricultural self-employment as the main source of household income is the deleted dummy variable among the different livelihood strategies, and each coefficient is interpreted as the percentage difference in mean household well-being compared to agricultural self-employed households. Agricultural wage employment and non-agricultural wage employment are associated with lower household consumption levels than self-employment in agriculture, but non-agricultural self-employment is a clear means of increasing household well-being (more than 8 percent improvement in well being compared to the agricultural self-employed households).

**Regional differences in well-being**

The regression coefficients and their implied elasticities differ substantially according to the region of residence. In the above regression, we assumed that impacts of region of residence are fully captured with an intercept shifter (the regional dummy variable). These regional dummy variables show how unmeasured factors affect mean levels of household well being. Statistical tests indicate that the intercept shifters do not capture all inter-region differences, so we run separate regressions for each region of residence (table 3.5; table 3.6 shows results with the employment strategies included in the regression) to get a sense of regional differences in the relationship between asset holding and well being. Differences in the distribution of well being across regions can be attributed either to differences in assets or in differences in returns to key assets, or a combination of both. Two types of regressions are presented in table 3.5: a mean (OLS) regression and a quantile regression at the median. The latter is reported because such regressions are more robust to outliers and other problems. The results from the two regressions are similar.

The relationship between family composition variables (such as headship) and well-being (the “return” to these assets) depends on the region of residence, while the effect of dependency is relatively constant across the country (the elasticity of consumption with respect to the dependency ratio is between -.2 and -.5 for most of the regions). Ethnicity also has a fairly constant effect, with non-indigenous households enjoying a 20-30 percent higher level of well-being compared to indigenous households in all regions, except Metropolitan and Peten regions, where the ethnicity effect is not statistically different from zero. Indigenous households are, holding other assets (even human capital) constant, significantly worse off in virtually every region of Guatemala.

In order to better understand the source of lower mean levels of well-being among the indigenous in rural Guatemala, we investigated the influence of language. In

\(^{34}\) We are not interpreting the coefficients in column 3 of table 3.4 in a causal sense; we are simply examining mean consumption expenditures conditional on choice of livelihood strategy. These results are suggestive, but do not indicate that a change in the household livelihood strategy will necessarily lead to a given change in well being. These two outcomes are, indeed, likely to be endogenously determined. Below we present results of a structural model of employment choice that accounts for this endogeneity.
auxiliary regressions, we entered an addition dummy variable reflecting whether the household was monolingual, speaking only an indigenous language (final two columns of table 3.5). If language explained much of the lower levels of well-being, a case could be made that labor markets were reflecting lower language skills of the indigenous. In such a case, the lower well-being among the indigenous would be explained by their lack of language skills. A logical policy intervention would be to improve Spanish language skills among adults and children in indigenous households. We find, however, that monolingual indigenous-speaking households are worse off than bilingual and Spanish-speaking households, but that even controlling for language, indigenous households were worse off than the ladinos, holding other assets constant. The effects of other variables in the regression are virtually unchanged when we add the dummy variable for language. This finding is evidence of a strong and important pattern of discrimination against the indigenous in rural Guatemala.

Returns to access to electricity also vary by region. Returns are highest in the low-electricity North and Northwest Regions, while differences in well being between households with and without electricity are virtually zero in the Metropolitan rural area. Interestingly, electricity access, which is extremely limited in Peten, does not substantially increase well being in this isolated frontier region. More investigation is needed, but this finding might indicate that electricity distribution is being targeted toward the most disadvantaged areas of the Peten. The regression coefficient might reflect this targeting and might not reflect a causal relationship between access to electricity and higher measured household welfare. These results suggest that heterogeneity of economic activities in the Peten lead to success stories: many households prosper without access to electricity.

The impact of internal distance on well-being varies by region of residence. Distance has its strongest negative impact on household well being in Metropolitan, Central and Southeast Regions. It does not have a statistically significant effect in the Western Altiplano (Northwest and Southwest region), but, as we see below, the distance-well being relationship depends on the livelihood strategy. In Metropolitan Region, distance has a non-linear effect on well-being; households that are very near and very far from post offices are better off. This non-linear effect was also found by Hereford and Echeverria for other Central American countries.

Regional differences in returns to education

Increased well-being associated with levels of education varies substantially by region of residence (table 3.5). Returns to secondary education are strong in every region except the Metropolitan Region and vary from a low of 28 percent (above no education) to more than 70 percent, depending on the region of residence. Lowest returns to

35 Note that the dependent variable (household consumption expenditures per capita), our measure of well being, is constructed by summing observed expenditures an all consumption goods. Because households pay for electricity, household access to electricity would be expected to raise measured consumption levels (depending on the costs of alternative fuels).

36 From auxiliary regression. Results available from author.
secondary education are found in areas where secondary education is less common and poverty is highest: the Northwest and Peten Regions. These areas likely lack economic activities that reward higher levels of education. Findings of relatively low returns to higher levels of education may indicate that better-educated people quickly leave these areas; those that stay are not rewarded to the same extent as in other regions. The differential return from primary to secondary education is also low in the North and Peten; in the North, households headed by someone with secondary school education have, on average, only eight percentage points higher mean levels of well-being than those headed by someone with only primary school education. Primary school-educated heads have a “premium” over non-educated heads of approximately 20 percentage points. Household heads in the Northeast, Southeast and Central Regions receive secondary education premia (i.e. higher mean consumption per capita) of as much as 58 percentage points.

Highest returns to primary education are found in North and Southeast and Southwest regions. Lowest returns are found in the Central and Northwest regions, where the coefficient on primary education is small and statistically not different from zero. In other regions, the returns to primary education (above households headed by someone with no formal education) are between 9 and 12 percent. These findings provide some support for targeting a primary versus secondary education strategy: in high-poverty areas, the emphasis should be on promoting primary school attendance, while in better off areas, and those areas where households have complementary assets, the emphasis should turn to retaining students through secondary school. The finding of low returns to primary education in Northwest region, where incomes and levels of primary education are low, is surprising. Low returns might reflect differential quality of education, and an investigation of primary school quality might be appropriate for the Northwest.

The analysis of place-specific returns to education is clouded by mobility; better educated youth from low-return Regions are likely to migrate to other regions. This “endogeneity” of place of residence is likely to lead to overstatement of returns in high-return regions and understatement of returns in low-return regions.

More insights into the impacts of education are available by examining how education access affects the full distribution of well-being (figure 3.2). Education shifts the distribution of household well being in a rightward direction (indicating higher proportions of households at higher levels of consumption expenditures). The density of well being for households headed by someone with no education is shifted to the left of the entire rural sample (the density differences below the poverty line are positive and above the line are negative). At virtually all levels of consumption below the poverty line, the density for low-education households is larger than the rural sample as a whole; above the poverty line it is smaller. The distributions of well being for households whose head has primary and secondary education are, in contrast, shifted to the right of the entire rural distribution. The shift for secondary education households is especially pronounced and the right-tail of the distribution of well-being (i.e., high levels of well-being) is dominated by households with secondary education.
Regional differences in the impact of education on the distribution of household well-being are shown in figures 3.3 and 3.4. The distribution of well being for households headed by someone with primary education is shifted rightward in the Metropolitan rural region, and in the Northeast and Central Regions. Particularly in the Metropolitan Region, primary-educated households are generally found to be better off than the rural average primary-educated households; the density below the poverty line is much smaller and the density above the poverty line is much larger. The shifts are more subtle in the Northeast and Central Regions, while the Southeast and Southwest densities are virtually identical to the whole rural sample.

The North, Northwest and Peten distributions of well being for households headed by someone with primary education are located to the left of the rural sample. Relatively more households with this education level are well below the poverty line and fewer are found well above the poverty line compared to rural areas as a whole. The Peten distribution’s shape indicates, in fact, relatively large increases in households far below the poverty line and a slight growth in the proportion of households well above the poverty line for this level of education.

Secondary education has a much less pronounced regional pattern compared to that found for households headed by someone with only primary school education (figure 3.4). The Metropolitan density is well to the right of the rural whole, indicating that secondary education lowers poverty, but provides solid improvements in well-being at all points along the distribution in Metropolitan rural region. The Northwest and Peten distributions show irregular shifts with respect to the full rural sample, indicating that secondary education, although not as unambiguously good to all households, does benefit many. We view higher poverty among better-educated households in these regions (compared to the entire rural sample), but not all the impact is captured by differences in poverty rates.

This analysis shows that education’s impact differs significantly by level of education and region of residence. In some regions, higher levels of education of the household head are associated with broad-based improvement at all levels of well-being, but in others, the impact affects different points along the distribution. In such cases, success stories should be identified. That is, in order to more effectively target education we need to know which types of livelihoods (employment types) in which regions of the country reward education most consistently. We examine some of these issues in more detail below.

Access to assets versus returns to assets

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37 A similar analysis using highest education of the best-educated household member instead of head’s education yielded similar results. The highest education variable has a slightly less well-pronounced effect on well being because many of the highest educated members are still attending school. In this case, the household reaps no well being reward from that person’s education because he or she has not yet entered the labor market.
Access to assets clearly helps improve household well-being, but the importance of this access depends on the household’s location. For instance, the impact of education on household well-being is stronger in some areas than others. Knowledge of the relative importance of returns to assets versus mean access to assets by region will assist in the design of policies. For instance, if access is more important, then investment strategies can be formulated to address asset access, such as road building or investments in schooling. On the other hand, if differences in returns are responsible for the observed differences in outcomes, a different policy focus might be warranted. Targeted productive investments might build returns to specific assets, or information might be provided to better match asset bases with places where returns are highest (through efficient out migration).

In order to examine the relative importance of returns versus access to assets, a simple decomposition of means is used (Oaxaca 1973). The decomposition is written as:

\[
\Delta \ln C_{m-j} = \beta_m (X_m - X_j) + (\beta_m - \beta_j) X_j
\]

where \(m\) represents the base region (rural Metropolitan) and \(j\) indexes the comparison region, \(X\) is a vector of mean levels of assets for each region and \(\beta\) represents the regression coefficients (which vary by region of residence). The difference in mean consumption between each region and the base is decomposed into two components. The first component, shown as the \(\beta_m (X_m - X_j)\) factor in equation A.3.2, represents the effect of differences in mean levels of assets. The second component, \((\beta_m - \beta_j) X_j\), reflects differences in returns between each region and the base. This decomposition is applied to the regression results shown in table 5 and computed mean asset levels by region. Results are shown in table 3.7 (results for individual assets are shown in table 3.8).

Low level of assets in the North and Northwest Regions explain a large part of the lower mean levels of well-being there compared to those in the Metropolitan Region. Lower mean levels of assets are responsible for roughly 40 percent lower levels of well being compared to the Metropolitan region. The main assets associated with lower levels of well being in these regions are ethnicity, dependency and distance (table 3.8). Lower levels of secondary schooling also contribute to lower levels of well-being.

Low levels of assets in Peten also help explain the low levels of mean consumption there, but the effect is much smaller compared to the North and Northwest. In Peten, ethnicity is not a problem, but dependency and distance cause mean levels of well-being to be significantly lower. Mean asset holdings in the Northeast, Southeast and Central Regions, in contrast, are relatively larger than in the Metro, and mean levels of living in these regions would actually be somewhat lower if mean asset holdings were lowered to those of the Metropolitan Region.

Returns to assets are, however, lower in Northeast, Southeast, and Central Regions compared to the Metropolitan rural region. For example, mean consumption in Central Region would be approximately 20 percent higher than it actually is if the returns to assets found in Metropolitan region existed in Central region. Higher aggregate
returns to assets in the North and Northwest somewhat mitigate the low mean asset bases that are found there. Results for Peten are somewhat troubling as low returns to assets compound the problems of low mean asset bases. While higher returns to all assets in North and Northwest regions might induce asset migration into these areas, few incentives exist for the private market to improve asset bases in Peten. The aggregate return to these assets is sufficiently low.

Simulation of increased asset bases: transportation infrastructure and education

Two simulations were run to examine the impacts on well-being of investments in two key assets: transportation infrastructure and education. The first simulation addresses the following questions: What would be the impact on well-being if transport investments in paved roads reduced travel time? What would be the impact if these transport investments instead focused on dirt or unpaved roads? Our regression results showed that travel time has a statistically significant impact on welfare: a ten-percent decrease in travel time will raise average rural welfare by .5 percent. The second simulation asks: What would the distribution of rural well-being if investments were made in education so that average levels of education in rural areas were the same as in urban areas?

Rural transportation infrastructure

To examine the differential impacts of improvements in paved rural roads versus dirt (unpaved) roads, several assumptions were necessary. These were: (i) improved paved road reduces travel times for households located near paved road by 40 % and those not located near paved road by 10 %; (ii) improved dirt roads lowers travel times to those not located near paved roads by 40 %, but does not affect travel times of those living near paved roads. In addition, we assume that the distribution of well-being conditional on all other assets is structurally invariant to the distribution of time traveled.

We adjusted consumption expenditures for all households using the regression coefficient on the dtmail variable in our well-being regressions (see table 3.5: the coefficient was -.0003898) multiplied by 40% and 10% of the actual reported travel time for each household. The formula is as follows:

\[
(A.3.3) \quad \log C_{\text{new},i} = \log C_{\text{old},i} + .0003898 \times \text{dtmail}_i \times \text{Pct}_i
\]

where the “new,” “old” subscripts refer to new and old levels of consumption, the i indexes the household, and Pct refers to .10 and .40 as appropriate, depending on the household’s location (on or off a paved road) and the simulation in question. The distributions of LogC_{old} and LogC_{new} are shown in figure 5. Density differences are shown in the lower panel.

Both investments have subtle effects on the distribution of well-being (see figure 3.5), shifting it rightward and leading to a general improvement in well-being. Slight differences in impacts are evident in the bottom panel of the figure, where the investment
in dirt roads has a stronger impact at the low end of the welfare distribution, and shifts the
distribution of well-being to higher levels above the poverty line. This result shows that
an improvement in existing dirt roads will have a stronger impact on well-being for
worse-off households (these also have worse access to start with). However, the
differences are not large.

A clear drawback to this method of simulation is that it abstracts from costs of
road construction and we have no reliable information about the impacts of projects on
travel times. A given resource investment on impassible dirt roads may have a vastly
different impact on travel times than a similar investment on paved roads. Information
on costs and relative impacts will improve the validity (and usefulness) of this simulation.

Rural educational improvements

Education improvements are simulated in a slightly different fashion. We saw
that the distribution of household well-being depends on the educational attainment of the
head; households headed by better-educated people tend to be better off than others. We
use non-parametric density reweighting techniques to examine how the distribution of
rural well-being would look if the distribution of education of the household head in rural
areas were the same as that in urban areas (see Alwang, Mills and Taruvinga 2002, for an
illustration of the technique). Assume that the conditional distribution of welfare is
structurally invariant to the distribution of head’s education. We reweight the rural
distribution of well-being to represent what it would look like if the head’s education
were distributed as it is in urban areas (see table 3.9).

Results are shown in figure 3.6. Improvements in rural education (placing them
at par with levels of attainment in urban areas) will lead to a strong rightward shift in
well-being, reduce poverty and improve prospects for growth. As noted in the text, the
impacts will depend on the area of residence, with stronger impacts in better-endowed
areas, but the entire increase in density occurs above the poverty line.

5. Livelihoods and well-being

Rural household livelihood strategies can have major impacts on outcomes such
as levels of well-being, incomes, rates of poverty and an area’s future growth potential.
Through these outcomes and subsequent investment decisions, the future household asset
base and its potential to increase well-being over time is determined. We begin exploring
the role of livelihood strategies by examining household labor allocation decisions
(among occupations). As expected, households with members who are predominantly
engaged in agriculture tend to have lower levels of living, lower incomes, and higher
rates of poverty and extreme poverty than other rural households (table 3.10). Rates of
extreme poverty, in particular, fall dramatically if the household has at least one member
working in communications, transportation or other professional endeavors. Households
with transportation workers and other professionals have consumption levels that are
nearly double and incomes that are more than double those of households who only have
members working in agriculture. Employment strategies are clearly related to well-being related outcomes.

Alternative indicators of livelihood strategies

Livelihood strategies can be characterized in a number of ways and one means is by examining whether the household employs a specialized or diversified earning strategy. Rural households that specialize in non-agricultural activities have the best indicators of well-being, including higher incomes and consumption and lower poverty rates (table 3.10). Households specializing in agricultural employment have slightly lower levels of income and consumption than those employing a mixed strategy (between agricultural and non-agricultural activities) but far higher rates of extreme poverty. Findings indicate a high degree of heterogeneity within livelihood strategy classes. Some households following a mixed strategy are doing quite well, but so are many households with specialized strategies inside and out of agriculture. This heterogeneity requires further analysis, particular of mixed income/employment strategies, and under which conditions a mixed strategy may be preferred to a specialized one.

A different means of categorizing livelihood strategies is by examining each activity’s contribution to total household income (e.g. Corrall and Reardon 2001). In rural areas, incomes are earned in many different activities, and most households report numerous sources. Even those households that specialize in agricultural employment receive income from different crops and agricultural activities, from working on neighboring farms and from non-agricultural, non-earned sources (such as remittances, interest and rental, and transfer payments). However, the data show a clear and strong relationship between the major source of household income and well-being related outcomes (table 3.11). The worst-off households in rural areas are clearly those that receive the majority of income from agricultural wage employment. Their consumption levels are about 20 percent below self-employed agricultural households and about 45 percent below those of the best-off households – those with a majority of household income coming from off-farm self employment.

Non-agricultural income sources, which are associated with higher levels of well-being, need more investigation. Households engaged in non-agricultural self employment have about 12 percent higher consumption and income levels compared to those primarily engaged in non-agricultural wage employment, but differences in poverty rates by non-agricultural income source are rather minor. This finding, consistent with other studies (such as Hereford and Echeverria 2002) indicates the varied nature of self employment: some of the self-employed are doing quite well, while others are not. Some of the difference is explained by differences in location.

Livelihood strategies follow a strong spatial pattern consistent with findings of regional variability in asset holding and well-being (see table 3.3). Livelihood strategies associated with better household outcomes are concentrated in the more favored regions such as Metropolitan, Central and Northeast rural regions. Transportation employment and professional employment is most common in these regions, and agricultural
employment—already shown to be the least lucrative—is least common. Transportation employment is particularly concentrated in the Guatemala Metropolitan Region, where more than 10 percent of households report having at least one member employed in the transportation industry. Outside of the Metropolitan rural region, the Northeast and Central Regions have the highest proportions of households with at least one transportation worker, but the percentages are far below those of the Metropolitan Region. Employment in the health sector is also highly concentrated in the Metropolitan Region, followed by the Northeast and Southwest. In fact, all the more highly remunerative employment types were concentrated in the generally better-off regions. These areas also tend to be located near urban centers and spillovers from urban economic activities are benefiting households in neighboring rural areas.

As noted, agricultural wage households tend to be the worst-off of all rural households. While households whose main source of income is wages in agriculture are found throughout Guatemala, 30 percent of all households in North Region rely on agricultural wages as their primary income source, and 20 percent of the households in Northwest Region. Relatively fewer households in Southeast, Central and Southwest Regions have members employed in agriculture (compared to Peten, the North and Northwest regions), but household reliance on agricultural wages as a primary source of income is relatively high. These areas produce the major part of Guatemalan coffee and tropical agricultural exports and differences in livelihood strategies within these regions are likely to reflect major differences in well-being. Non-agricultural salary employment is widespread, but far less common in the poorest regions of the country (the North, Northwest and Peten regions).

In summary, the spatial pattern of livelihoods closely follows that of outcomes. Areas with better mean levels of well-being and less poverty are also those areas where more highly remunerative livelihood strategies predominate. It remains to be seen why this is the case. That is, are the better livelihood strategies more common in better off areas because local conditions favor investment and employment in specific sectors? Or, are labor market supply conditions such that better asset-endowed households, which predominate in better-off areas, are able to undertake more favorable livelihood strategies and improve their asset positions and levels of living.

Determinants of livelihood strategies and well-being

Rural households in Guatemala adopt a variety of income-earning strategies and, as seen above, this strategy has an impact on the welfare outcome. We categorize these “livelihood strategies” into seven general classes that reflect the degree of dependence on income from different sources (see table 3.12 for a description of these strategies and table 3.13 for measures of asset ownership and household welfare outcomes by strategy). Obviously, assets and well-being outcomes vary according to the strategy adopted by the household. An important determinant of rural growth is the degree to which strategies contribute to well-being and how asset bases affect the viability of such strategies. Asset strengthening efforts can focus on promoting participation in “better” strategies.
Land is probably the most important asset helping determine the livelihood strategy and household well-being in rural Guatemala. As noted in several places in the main report, land access is closely associated with household well-being, and a major determinant of pervasive rural poverty in high density areas such as the Western Altiplano is inadequate access to land. However, land access is clearly endogenous to well-being (people are poor because they have no land and people have no land because they are poor). In addition, the relationship between land access and well-being is mediated by the livelihood strategy: it makes little sense to regress well-being on land ownership without accounting for differences in this relationship by livelihood strategy. In this section, we examine the relationship between land ownership, livelihood strategies and household well-being while acknowledging the joint endogeneity of the variables.

We begin with a simple model of the determinants of household well-being:

\[(A.3.4) \ln \text{Consumption}_j = f(\mathbf{X}_j, \mathbf{Z}^0_j, \mathbf{Z}^1_j, W^*_j, L^*_j)\]

where \(\mathbf{X}_j\) represents a vector of household-specific covariates including human capital and other household assets, and \(\mathbf{Z}_0^j\) is a vector of location-specific exogenous regressors including population density and population growth rates. The vector \(\mathbf{Z}^1_j\) represents exogenous variables affecting the consumption levels directly; these include the proportion of the population that is literate and a variable representing soil quality. The variable \(W\) represents the work choice of household \(j\) (see table 3.12 for definitions) and \(L\) is access to land including owned and rented land, by the \(j\)th household. \(W\) and \(L\) are household choices, determined by household status and the asset environment; this choice is denoted using the * notation. \(W\) and \(L\) are determined as follows:

\[(A.3.5) W^*_j = f(\mathbf{X}_j, \mathbf{Z}_0^j, \mathbf{Z}_2^j, L_j, C^*_j)\]
\[(A.3.6) L^*_j = f(\mathbf{X}_j, \mathbf{Z}_0^j, \mathbf{Z}_3^j, W^*_j, C^*_j)\].

The \(Z\) vectors contain exogenous variables that affect only the choice of work (\(Z^2\)) and land access (\(Z^3\)). The three equations comprise a set of simultaneous variables that we estimate using 2-stage least squares. In the first stage, we estimate the reduced forms by regressing:

\[(A.3.7) \Psi_j = f(\mathbf{X}_j, \mathbf{Z}_0^j, \mathbf{Z}_1^j, \mathbf{Z}_2^j, \mathbf{Z}_3^j)\],

where \(\Psi_j\) is the vector (\(\ln C_j\), \(W_j\), \(L_j\)). We use predicted values of \(\Psi^*_j\) in the structural regression of equations A.3.4-6. The exclusion restrictions on the \(Z\) help identify the variables. The reduced forms and structural equations for \(W_j\) and \(L_j\) are estimated using multinomial logit and tobit type-2 estimators, respectively. Table 3.4 contains descriptions and summary statistics for all variables in the model. Because of the structural nature of the model, exogenous municipio-level variables were used as instruments. These variables came from a variety of sources and were merged with the household data set (see table 3.14 for a complete description).

Determinants of household livelihood strategy

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Asset bases have strong impacts on household well-being through their effect on decisions such as adoption of an income-earning strategy. This finding is seen through the 2-stage multinomial logit results shown in table 3.15. Households with higher dependency ratios are more likely to adopt agricultural wage-oriented strategies, while lower dependency ratios are associated with more frequent use of agricultural self-employment and employment in non-agricultural activities. Lower dependency has the strongest positive impact on adoption of non-agricultural wage and self-employment strategies, which, as noted above, are associated with better household welfare outcomes. Higher education of the head induces the rural household to participate in non-agricultural activities, while lower education makes agricultural, particularly agricultural wage, strategies more likely. Thus, better education and lower dependency induce rural households to adopt more lucrative income-earning strategies (accounting for differences in landholding and in welfare).

Indigenous households, holding other assets constant, are more likely to engage in agricultural wage labor as their dominant income-earning strategy. Ethnicity does not have a strong statistical impact on other choices of employment, but non-indigenous households are relatively more likely to engage in non-agricultural self employment (associated with the highest levels of well-being). Lack of Spanish-speaking ability prevents rural families from engaging in non-agricultural wage activities, but outside this effect it has only a minimal (not statistically significant) impact on employment choice.

Access to different public and private assets are important determinants of choice of livelihood strategy. Access to electricity drives households away from agricultural wage employment and towards non-agricultural wage employment, while distance from local facilities increases the likelihood of an agricultural-based strategy and decreases the likelihood of non-agricultural activities. These electricity and distance effects on choice of livelihood strategy partly explain their impacts on well-being: access to electricity and location near a post office stimulates participation in more remunerative income-earning strategies. The strongest and most significant effects of distance are to lower the probability that the household adopts non-agricultural specialized strategies. These strategies, which are clearly associated with increased household well-being, are neither prevalent nor viable more than a minimal distance from a market center. This finding illustrates the means by which investments in road infrastructure contribute to long-run improvements in well-being. Improved road access stimulates participation in better income-earning activities and “more bang for the buck” can be obtained through simultaneous investments in infrastructure and productive assets.

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38 The results show the marginal effect of a change in each variable on the log odds ratio of income earning strategies with respect to the deleted income earning category (mixed non-agricultural strategies).
39 Holding household well being and landholding constant. We also conducted this regression with segmento compacto-level indicators of committee participation and found the results to be qualitatively unchanged.
Household access to social capital has an important influence on the choice of livelihood strategy. Households that participate more intensely in local committees\(^40\) are much less likely to be dependent on income from agricultural wage labor. Agricultural wage-dependent households tend to be socially excluded and do not participate as frequently in community political and social committees. As a result, these households may be less able to manage risks and benefit less from the positive influences on well-being of investments in social capital. Policies might be designed to more actively promote membership and participation among households specializing in agricultural wage earning. Alternatively, social capital building can be concentrated in areas where large proportions of agricultural wage earners live, as the segmento compacto-level estimates are similar.

Higher population densities in municipios are associated with less dependence on mixed agricultural strategies, but population density only had minor impacts (not statistically significant) on the odds of choosing other livelihood strategies relative to a mixed non-agricultural strategy. Other municipio-level measures of population growth and road density had only minor impacts on the choice of livelihood strategy. In particular, increased road density did not have a statistically significant impact on the odds of adoption of any livelihood strategy. Since we are already controlling for the household-level proximity to a post office, the municipio-level measure of road density adds nothing of significance in explaining this choice.

The most important municipio-level determinant of the household strategy was the percentage of total crop land planted to perennials. Higher percentages of perennials were associated with higher likelihoods of specialized agricultural strategies (self and wage employment), mixed agricultural strategies and mixed agricultural/non-agricultural strategies. High-perennial areas (including coffee-growing areas in the Western Altiplano and banana and sugar-growing areas near the coastal regions) contain much higher densities of agricultural production and more dependence by households on agriculturally derived incomes. The regional dummy variables have very weak impacts on choice of livelihood strategy.

The analysis of household livelihood strategies sheds light on the path by which many of these variables affect household well-being. Investments in education, for example, increase well-being over time, and their effect is mainly mediated through choice of employment. As noted above, in some regions even where overall levels of education are low, education does not have strong impacts on well-being. This lack of impact is most likely due to labor market effects: opportunities do not exist for employment in more remunerative activities and returns to education are low. Under such conditions, migration may be the most viable exit strategy.

The other endogenous variables in our system (land ownership and consumption) have strong effects on the choice of income-earning strategy. More land access significantly lowers the odds of adopting a wage-agriculture strategy and also lowers the

\(^{40}\) We also conducted this regression with segmento compacto-level indicators of committee participation and found the results to be qualitatively unchanged.
predominance of adoption of specialized non-agricultural strategies. Policies to improve access to land will induce more mixed agricultural (particularly self-employment) strategies while possibly lowering off-farm participation of lower-income families.

**Structural determinants of land access and well-being**

Structural determinants of size of land access (land owned plus rented) largely conform with expectations (table 3.16). Households headed by males have, on average, larger holdings, while dependency and education of the head are negatively associated with holding sizes. Even controlling for household well-being and the choice of livelihood strategy, households with higher dependency ratios have lower land holdings. The relationship between education and land holding reflects the influence of employment/income generation choices as higher levels of educational attainment are associated with non-agricultural strategies and smaller holdings, all else held equal. Ethnicity was not a statistically significant determinant of landholding once endogenous choices were held constant. However, similar regressions using only observations from the heavily indigenous Northwest and North Regions showed that there indigenous households had significantly lower holdings than ladino households.

As expected, households in more densely populated municipios have smaller holdings, while those in municipios whose population grew faster between 1994 and 2002 have marginally larger holdings. Households in areas where agricultural producers predominate as a proportion of the total population have larger holdings (remember that we are holding overall population density constant). Migration appears to be pushing people toward areas that are less densely populated and with more land availability.

The (endogenous) livelihood choices of the households also have expected effects on landholding sizes, although the effects are not as strong as might be expected. Households who are self-employed in agriculture have far higher holdings than those whose livelihood strategy is predominantly based on non-agricultural activity (the deleted group). Households who are self-employed outside of agriculture have significantly smaller holdings, while holdings of wage-employed households are not significantly different from the comparison group. Once we control for all the variables in the model, additional household well-being is not a statistically significant determinant of landholding sizes.

Finally, we turn to the structural determinants of household well being, controlling for the endogeneity of holding size and livelihood strategy (table 3.17). The impacts of the household-level exogenous variables do not differ substantially from the findings of the previous analyses; dependency, education, ethnicity and location are all important determinants of well-being with expected signs and magnitudes. Male-headed households are substantially worse off, even controlling for livelihood strategies and holding sizes. Males have larger holding sizes and are significantly more likely to adopt agricultural-dominated livelihood strategies, but even controlling for these factors, we find male-headed households to be worse off.
Household welfare declines as we move farther from services (distance to post office) and, interestingly, higher population densities in the municipio are associated with lower levels of well-being. Municipios with higher soil quality are associated with, holding all other factors constant, higher levels of household well-being.

The analysis shows that the best “strategies” in terms of generation of household well-being are non-agricultural, with non-agricultural self employment having the most significant positive impact. As a result, investments in education and efforts to reduce remoteness will improve growth prospects for rural areas by directly improving the income-generation potential of households and their livelihoods and by inducing households to undertake more highly remunerative livelihood strategies.

6. Agricultural growth and household well-being

Agriculture can be a significant engine of growth and poverty reduction to the Guatemalan economy. Past performance of the sector has been spotty, but several bright spots exist, including the non-traditional export sector (Carletto et al. 1999). Falling international prices for coffee, Guatemala’s most important agricultural export, increasing competition from international producers of maize and other grains, and weather-related problems have all contributed to a sense of crisis in the agricultural sector. The high degree of rurality and reliance, documented in this study, of rural households on agricultural and related income mean that any rural strategy will have to build upon the economic base created by agriculture.

We devote special attention to agriculture and policies and investments that might improve its contribution to rural welfare. We focus on assets that have already been identified as important such as land, access to infrastructure and markets, human capital and others, but expand the analysis to include the impacts of agriculture-specific interventions. These include: (i) redistribution or enhanced access to agricultural land, (ii) research into new varieties and production techniques, (iii) investments in technical assistance, (iv) investments in irrigation, and (v) crops produced. In the latter category we investigate fruits, horticultural products, traditional and non-traditional exports.

Land access per household varies tremendously according the agricultural region (table 3.18). Access in Western Altiplano averages about one hectare per family, while in the Northern Lowlands it exceeds 20 hectares. Important spatial differences in land access imply different strategies for agricultural development; in the Western Altiplano, land saving innovations such as irrigation and varieties that increase yields by using labor in a more intensive fashion are needed. In areas where landholdings are more extensive, labor-savings innovations, such as enhanced mechanization might be appropriate to increase productivity per unit of labor.

Irrigation infrastructure is most commonly found in the more densely populated southern and eastern areas of the country. In the Western Altiplano and South Coast high proportions of farmers have access to irrigation, but the average amount of irrigated land is relatively small. In the East, almost 14 percent of farmers have irrigation, and the
average land size under irrigation is large. Irrigation and access to it appears to have a strong effect on production patterns. Horticultural and non-traditional export production are most frequently found in areas where irrigation is most prominent and transportation infrastructure is most dense.

South Coast farmers are most likely to use modern inputs such as improved seeds, pesticides, and chemical fertilizers. Despite the small holding sizes in Western Altiplano, agriculture there is characterized by only limited use of modern inputs. Relatively few farmers purchase improved seeds, and few report purchasing soil fertility enhancing inputs such as organic and chemical fertilizers. This lack of penetration of modern inputs into this important region is cause for concern, unless aggressive alternative means of enhancing soil fertility are found.

Access to technical assistance and participation in field days (to share experiences among farmers) is limited across the country. Access to technical assistance is highest in Alta Verapaz, possibly due to the high proportion of traditional export producers, possibly to the predominance of cooperatives and other producer organizations in the region (AVANSCO 2001). Virtually no technical assistance is reaching the Northern Lowlands and few means of assisting producers exist.

Determinants of well-being among farm families

Several regression models were estimated to examine the relationship between investments, assets and farm-family well being. The results are summarized in table 3.19. Three models are presented: the first two columns show results from the simplest model. The second two columns add interactions between key assets—distance, education and land. The final columns show results when possibly endogenous variables (purchase of chemicals and seeds) are added. The first thing to notice when comparing these results is that the coefficients on the statistically significant variables are stable and do not vary much when the model is augmented with additional variables. This is a sign that the problem of endogeneity (e.g. of use of chemical fertilizers) is not a serious one.

The second thing to notice is the statistical significance of all the key asset variables follows the same pattern as that found in earlier regressions: family structure and dependency, education, ethnicity, access to electricity and access to markets are all important determinants of well being. If these results are compared to those of the full rural sample presented in table 3.3, the sign, magnitude and significance of the coefficients are virtually unchanged. One fairly important difference is the magnitude of the distance to market variable. For farm families, distance to market has about twice the impact on well being as it does for non-farm families.

The third point is the importance to well being of the “intervention” variables. Land access, presence of irrigation and the amount of land under irrigation are all statistically significant and have a positive association with well-being. While access to
technical assistance is not significant\textsuperscript{41}, attendance in a farm-oriented field day is positively associated with well-being. The significance and magnitude of these effects is constant across the model.

The second model includes interactions between the three investment/asset variables (land, education, distance). These variables were included to determine if the effects of any of these factors depend on the presence of other factors, and only in the case of land and education does the effect appear to be large. The results show that secondary education of the household head enhances the welfare-increasing impacts of more land. The other interaction effects are small and statistically insignificant.

The final regression shows that the use of purchased seeds and chemical inputs are positively associated with well-being. The impacts of both these variables are very similar in magnitude, leading to about a 7 percent improvement in well-being.

\textit{Summary}

The results show that farm families are not really very different from additional rural households. Their well-being can be improved through investments in various assets, with education, access to markets and social capital all being important. As with other rural households, there appears to be ongoing discrimination against the indigenous; even controlling for other assets such as land, social capital, access to other production technologies, etc., indigenous households are significantly worse off (by close to 30 percent) in terms of consumption per capita. Farm families will benefit relatively more than non-farm rural families from improved access to markets.

Access to land is an extremely important factor in the well-being of farm families. Land has a stronger relative impact on well-being when it is combined with higher levels of education, so that policies to redistribute land should be complemented with education programs designed to improve retention of students beyond a second year of high school. Other interventions, such as irrigation, infrastructure and improved seeds and chemical fertilizers generally benefit farm families. The system of technical assistance seems to have been abandoned, and farmers reporting contact with extension and other forms of technical assistance are no better off than those without such contacts. However, participation in field days is a promising means of enhancing farmer welfare; households that participated in such events are around 20 percent better off than those that did not. The magnitude of this coefficient is suspect, but its statistical significance is relatively high.

\textsuperscript{41} The variable is a dummy variable asking whether the farmer had access to technical assistance in any form in the prior year.
References


Table 3.1. Variables in analysis. Key assets and measures of well-being, all rural Guatemala, by poverty status

<table>
<thead>
<tr>
<th>VARIABLE NAME</th>
<th>DESCRIPTION</th>
<th>ALL RURAL</th>
<th>POOR</th>
<th>NON-POOR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Human assets</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hhsiz</td>
<td>Household size</td>
<td>5.64</td>
<td>6.40</td>
<td>4.19</td>
</tr>
<tr>
<td>Depart</td>
<td>Dependency ratio</td>
<td>1.24</td>
<td>1.46</td>
<td>0.82</td>
</tr>
<tr>
<td>Mhh</td>
<td>Male-headed</td>
<td>85.3%</td>
<td>86.9%</td>
<td>82.3%</td>
</tr>
<tr>
<td>Hedlit</td>
<td>Head literate</td>
<td>64.4%</td>
<td>58.1%</td>
<td>76.5%</td>
</tr>
<tr>
<td>Hedpr</td>
<td>Primary school</td>
<td>46.0%</td>
<td>42.2%</td>
<td>53.3%</td>
</tr>
<tr>
<td>Hedsec</td>
<td>Secondary and above</td>
<td>5.5%</td>
<td>2.4%</td>
<td>11.4%</td>
</tr>
<tr>
<td>highmed</td>
<td>Highest education in household (years)</td>
<td>28.44</td>
<td>26.88</td>
<td>31.43</td>
</tr>
<tr>
<td>Poor</td>
<td>Percent poor</td>
<td>65.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Percent households</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ethnoind</td>
<td>Non-indigenous</td>
<td>50.9%</td>
<td>41.5%</td>
<td>69.0%</td>
</tr>
<tr>
<td>monospan</td>
<td>Monolingual Spanish</td>
<td>54.9%</td>
<td>45.5%</td>
<td>72.9%</td>
</tr>
<tr>
<td>monoid</td>
<td>Monolingual Indigenous</td>
<td>12.1%</td>
<td>16.4%</td>
<td>3.9%</td>
</tr>
<tr>
<td>biling</td>
<td>Bilingual</td>
<td>33.0%</td>
<td>38.1%</td>
<td>23.2%</td>
</tr>
<tr>
<td><strong>Financial assets</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Credit (% receiving)</td>
<td>2.09%</td>
<td>1.10%</td>
<td>3.99%</td>
<td></td>
</tr>
<tr>
<td>Savings (% having)</td>
<td>6.89%</td>
<td>2.27%</td>
<td>15.72%</td>
<td></td>
</tr>
<tr>
<td><strong>Physical assets</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent with</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>goodwater</td>
<td>Sanitary water</td>
<td>58.4%</td>
<td>56.6%</td>
<td>61.8%</td>
</tr>
<tr>
<td>goodsani</td>
<td>Good sanitation</td>
<td>14.3%</td>
<td>7.0%</td>
<td>28.3%</td>
</tr>
<tr>
<td>Elect</td>
<td>Electricity</td>
<td>56.3%</td>
<td>46.9%</td>
<td>74.3%</td>
</tr>
<tr>
<td>Percent owning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>microwave</td>
<td>Microwave</td>
<td>1.2%</td>
<td>0.0%</td>
<td>3.4%</td>
</tr>
<tr>
<td>Refri</td>
<td>Refrigerator</td>
<td>11.1%</td>
<td>3.2%</td>
<td>26.2%</td>
</tr>
<tr>
<td>Radio</td>
<td>Radio</td>
<td>73.9%</td>
<td>70.9%</td>
<td>79.5%</td>
</tr>
<tr>
<td>television</td>
<td>Television</td>
<td>33.6%</td>
<td>23.1%</td>
<td>53.6%</td>
</tr>
<tr>
<td>Car</td>
<td>Automobile</td>
<td>1.0%</td>
<td>0.2%</td>
<td>2.6%</td>
</tr>
<tr>
<td>ovehicle</td>
<td>Other vehicle</td>
<td>7.6%</td>
<td>3.0%</td>
<td>16.3%</td>
</tr>
<tr>
<td>bicycle</td>
<td>Bicycle</td>
<td>28.9%</td>
<td>21.9%</td>
<td>42.2%</td>
</tr>
<tr>
<td>telephone</td>
<td>Telephone</td>
<td>4.2%</td>
<td>0.7%</td>
<td>10.9%</td>
</tr>
<tr>
<td>Durval</td>
<td>Total value durables</td>
<td>3546.96</td>
<td>1297.08</td>
<td>7841.41</td>
</tr>
<tr>
<td>Ndur</td>
<td>Number of durables</td>
<td>3.63</td>
<td>2.53</td>
<td>5.74</td>
</tr>
<tr>
<td><strong>Spatial assets</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dtmail</td>
<td>Time to post office (minutes)</td>
<td>43.04</td>
<td>47.38</td>
<td>34.76</td>
</tr>
<tr>
<td>Dtbank</td>
<td>Time to bank</td>
<td>40.03</td>
<td>42.01</td>
<td>36.24</td>
</tr>
<tr>
<td>dtmarket</td>
<td>Time to market</td>
<td>51.34</td>
<td>57.52</td>
<td>39.55</td>
</tr>
<tr>
<td><strong>Natural Assets</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance to fuelwood (those who collect fuelwood) in KM</td>
<td>1.75</td>
<td>1.76</td>
<td>1.71</td>
<td></td>
</tr>
<tr>
<td>Distance to water source (those who haul water) in meters</td>
<td>278</td>
<td>313</td>
<td>195</td>
<td></td>
</tr>
<tr>
<td>Socap</td>
<td>Social capital (number of committees)</td>
<td>1.48</td>
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</table>

Source: ENCOVI (2000). Note: the percent poor refers to households in poverty, not people
Table 3.2. Assets by Region, rural Guatemala  
Source: ENCOVI (2000). Note: the percent poor refers to households in poverty, not people

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>METRO</th>
<th>NORTH</th>
<th>NE</th>
<th>SE</th>
<th>CENTRAL</th>
<th>SW</th>
<th>NW</th>
<th>PETEN</th>
</tr>
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<tr>
<td>Household size</td>
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<td>5.0</td>
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<td>1.2</td>
<td>1.2</td>
<td>1.4</td>
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<td>83.0</td>
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<td>85.7</td>
<td>82.9</td>
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<td>69.6</td>
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<td>43.9</td>
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<td>10.4</td>
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<td>Time to post office</td>
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<td>46.5</td>
<td>51.3</td>
<td>79.6</td>
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<td>Distance to water</td>
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<td>472</td>
<td>280</td>
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<td>308</td>
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<td>Social capital</td>
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<td>1.3</td>
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Table 3.3. Outcomes and strategies by Region

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<th>North</th>
<th>NE</th>
<th>SE</th>
<th>Central</th>
<th>SW</th>
<th>NW</th>
<th>Peten</th>
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<tbody>
<tr>
<td>Percent poor</td>
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<td>51.1</td>
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<td>5313</td>
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Livelihood strategies

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<th>North</th>
<th>NE</th>
<th>SE</th>
<th>Central</th>
<th>SW</th>
<th>NW</th>
<th>Peten</th>
</tr>
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<tbody>
<tr>
<td>Dags</td>
<td>42.1%</td>
<td>86.1%</td>
<td>58.97%</td>
<td>74.60%</td>
<td>63.19%</td>
<td>60.72%</td>
<td>77.86%</td>
<td>81.75%</td>
</tr>
<tr>
<td>Dmanus</td>
<td>22.3%</td>
<td>13.4%</td>
<td>12.57%</td>
<td>8.21%</td>
<td>20.47%</td>
<td>15.60%</td>
<td>18.95%</td>
<td>4.50%</td>
</tr>
<tr>
<td>Dconst</td>
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<td>5.1%</td>
<td>4.87%</td>
<td>9.63%</td>
<td>7.71%</td>
<td>11.99%</td>
<td>4.67%</td>
<td>4.82%</td>
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<td>12.95%</td>
<td>12.76%</td>
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<td>30.20%</td>
<td>26.09%</td>
<td>14.12%</td>
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</table>

Source: ENCOVI (2000). Notes: the percent poor refers to households in poverty, not people. Notes: “d” prefix represents a household with at least one member employed in the suffix economic sector. Dag means at least one member employed in agriculture; manu, const, comm., tran, prof, and health represent manufacturing, construction, communications, transportation, other professional and health sectors, respectively. Because of overlap, the column percents for the “d” classes need not sum to 100. The “m” prefix variables are defined as: magsal is a dummy variable representing whether salaried agricultural employment represents the largest source of income for the household; mnagsal represents non-agricultural salaries, mnagse is self-employment outside of agriculture.
Table 3.4. Regression of well-being on basic assets, all rural households. Dependent variable: log consumption per capita

<table>
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<tr>
<th>Variables</th>
<th>Base Model</th>
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<th>Livelihood Model</th>
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<th>Cluster Mean Model</th>
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<td>Coef.</td>
<td>t</td>
<td>Coef.</td>
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Source: ENCOVI (2000). Notes: * magsal is a dummy variable representing whether salaried agricultural employment represents the largest source of income for the household; mnagsal represents non-agricultural salaries, mnagse is self-employment outside of agriculture. The comparison (deleted) group is self-employment in agriculture. In the “cluster mean model,” the census segment-level mean of the * variables was entered in the regression to reduce the problem of household-level endogeneity.
Table 3.5. Mean and median (quantile) regression of well-being on basic assets, by Region. Dependent variable: log consumption per capita

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Source: ENCOVI (2000). The variable monoind is a dummy variable with a value 1 if household is monolingual indigenous speaking.
Table 3.6. Regression of well-being on basic assets and employment strategies, by Region. Dependent variable: log consumption per capita

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**Peten Region**

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Table 3.7. Oaxaca decomposition of mean differences in well-being (comparison region is rural Metropolitan)

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Source: Author’s computation based on table 5 regression results
Table 3.8. Oaxaca decomposition of mean differences in well-being by asset (comparison region is rural Metropolitan)

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### Table 3.9. Distribution of households by head’s education, by urban-rural

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### Table 3.10. Indicators of rural well-being by household livelihood strategy

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<td>71.9</td>
<td>20.3</td>
</tr>
<tr>
<td>Construction (dcons)</td>
<td>9.24%</td>
<td>4411</td>
<td>3772.1</td>
<td>65.2</td>
<td>13.6</td>
</tr>
<tr>
<td>Communication (dcomn)</td>
<td>21.22%</td>
<td>4982</td>
<td>4541.1</td>
<td>54.6</td>
<td>9.4</td>
</tr>
<tr>
<td>Transportation (dtrans)</td>
<td>2.94%</td>
<td>6623</td>
<td>6084.3</td>
<td>30.4</td>
<td>4.2</td>
</tr>
<tr>
<td>Professional (dprof)</td>
<td>4.83%</td>
<td>6798</td>
<td>7211.7</td>
<td>38.9</td>
<td>3.7</td>
</tr>
<tr>
<td>Health (dhealth)</td>
<td>9.62%</td>
<td>4955</td>
<td>4722.6</td>
<td>59.1</td>
<td>11.3</td>
</tr>
<tr>
<td>Other (dother)</td>
<td></td>
<td>6306</td>
<td>4895.2</td>
<td>40.1</td>
<td>11.6</td>
</tr>
</tbody>
</table>

| Household livelihood strategy               |      |                        |                   |              |                    |
| Specialized non-agriculture\(^a\)           | 47.8 | 5967                   | 5524.0            | 44.0         | 8.1                |
| Specialized agriculture\(^b\)               | 32.5 | 3579                   | 2645.3            | 76.1         | 25.3                |
| Mixed strategy\(^c\)                        | 19.6 | 3606                   | 3178.8            | 75.2         | 18.0                |

Source: ENCOVI (2000). Notes: \(^a\)All household members are employed only in non-agricultural activities; \(^b\)All household members are employed only in agricultural activities; \(^c\)Household has members employed in agriculture and non-agricultural activities.
Table 3.11. Indicators of well-being by primary source of household income

<table>
<thead>
<tr>
<th>Major Source of Household Income</th>
<th>Percent obs. in each class</th>
<th>Consumption per capita</th>
<th>Income per capita</th>
<th>Percent poor</th>
<th>Percent extremely poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, self employed</td>
<td>22.26%</td>
<td>3875</td>
<td>2981</td>
<td>74.49%</td>
<td>21.46%</td>
</tr>
<tr>
<td>Agriculture, wage employed</td>
<td>20.51%</td>
<td>3129</td>
<td>2636</td>
<td>80.52%</td>
<td>29.31%</td>
</tr>
<tr>
<td>Non-agriculture, wage employed</td>
<td>22.15%</td>
<td>5057</td>
<td>4968</td>
<td>52.91%</td>
<td>8.46%</td>
</tr>
<tr>
<td>Non-agriculture, self employed</td>
<td>10.91%</td>
<td>5691</td>
<td>5617</td>
<td>53.32%</td>
<td>11.22%</td>
</tr>
<tr>
<td>Transfers, other</td>
<td>24.58%</td>
<td>4614</td>
<td>3199</td>
<td>62.03%</td>
<td>16.10%</td>
</tr>
</tbody>
</table>

Table 3.12. Description of livelihood strategies in structural model

<table>
<thead>
<tr>
<th>LIVELIHOOD STRATEGY</th>
<th>DESCRIPTION</th>
<th>% HOUSEHOLDS IN LIVELIHOOD CLASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-employed in agriculture</td>
<td>&gt; 60 % of household income comes from self employment in agriculture</td>
<td>15.15</td>
</tr>
<tr>
<td>Wage-employed in agriculture</td>
<td>&gt; 60 % of household income comes from wage employment in agriculture</td>
<td>12.74</td>
</tr>
<tr>
<td>Mixed agriculture</td>
<td>&gt; 60 % of household income comes from agriculture, but less than 60 % comes from self employment or wage employment alone</td>
<td>10.57</td>
</tr>
<tr>
<td>Mixed</td>
<td></td>
<td>12.60</td>
</tr>
<tr>
<td>Mixed non-agriculture</td>
<td>&gt; 60 % of household income comes from outside of agriculture, but less than 60 % comes from self employment or wage employment alone</td>
<td>26.91</td>
</tr>
<tr>
<td>Non-agriculture wage employment</td>
<td>&gt; 60 % of household income comes from wage employment outside of agriculture</td>
<td>6.09</td>
</tr>
<tr>
<td>Non-agriculture self employment</td>
<td>&gt; 60 % of household income comes from self employment outside of agriculture</td>
<td>15.95</td>
</tr>
</tbody>
</table>

### Table 3.13. Household assets by livelihood strategy

<table>
<thead>
<tr>
<th>VARIABLE NAME</th>
<th>SE-AG</th>
<th>W-AG</th>
<th>MIX-AG</th>
<th>MIXED</th>
<th>MIX-NON</th>
<th>NON-WAGE</th>
<th>NON-SELF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hhsize</td>
<td>6.85</td>
<td>6.96</td>
<td>7.00</td>
<td>7.21</td>
<td>6.84</td>
<td>6.46</td>
<td>6.61</td>
</tr>
<tr>
<td>Depart</td>
<td>1.49</td>
<td>1.37</td>
<td>1.41</td>
<td>1.49</td>
<td>1.58</td>
<td>1.29</td>
<td>1.11</td>
</tr>
<tr>
<td>Mhh</td>
<td>95.7%</td>
<td>93.0%</td>
<td>95.4%</td>
<td>89.8%</td>
<td>76.9%</td>
<td>87.4%</td>
<td>89.9%</td>
</tr>
<tr>
<td>Hedlit</td>
<td>55.9%</td>
<td>56.6%</td>
<td>51.4%</td>
<td>59.3%</td>
<td>68.3%</td>
<td>67.4%</td>
<td>82.4%</td>
</tr>
<tr>
<td>Hedpr</td>
<td>38.9%</td>
<td>43.8%</td>
<td>37.7%</td>
<td>41.8%</td>
<td>48.5%</td>
<td>46.3%</td>
<td>59.9%</td>
</tr>
<tr>
<td>Hedsec</td>
<td>1.2%</td>
<td>1.5%</td>
<td>1.1%</td>
<td>2.0%</td>
<td>5.4%</td>
<td>8.4%</td>
<td>12.2%</td>
</tr>
<tr>
<td>highmed</td>
<td>27.01</td>
<td>26.24</td>
<td>26.18</td>
<td>29.62</td>
<td>31.54</td>
<td>32.29</td>
<td>37.69</td>
</tr>
<tr>
<td>Poor</td>
<td>82.0%</td>
<td>86.7%</td>
<td>87.5%</td>
<td>82.5%</td>
<td>69.2%</td>
<td>63.5%</td>
<td>55.9%</td>
</tr>
<tr>
<td>ethnoind</td>
<td>43.9%</td>
<td>48.8%</td>
<td>34.6%</td>
<td>42.0%</td>
<td>49.9%</td>
<td>44.3%</td>
<td>65.1%</td>
</tr>
<tr>
<td>monospan</td>
<td>45.3%</td>
<td>54.7%</td>
<td>38.0%</td>
<td>47.3%</td>
<td>54.4%</td>
<td>44.7%</td>
<td>69.6%</td>
</tr>
<tr>
<td>monoid</td>
<td>23.4%</td>
<td>13.1%</td>
<td>21.3%</td>
<td>14.3%</td>
<td>8.2%</td>
<td>7.7%</td>
<td>5.5%</td>
</tr>
<tr>
<td>Biling</td>
<td>31.3%</td>
<td>32.2%</td>
<td>40.7%</td>
<td>38.4%</td>
<td>37.4%</td>
<td>47.7%</td>
<td>24.9%</td>
</tr>
<tr>
<td>goodwater</td>
<td>44.8%</td>
<td>44.6%</td>
<td>52.0%</td>
<td>55.4%</td>
<td>67.2%</td>
<td>66.8%</td>
<td>71.3%</td>
</tr>
<tr>
<td>goodsani</td>
<td>5.2%</td>
<td>9.7%</td>
<td>3.8%</td>
<td>9.5%</td>
<td>15.3%</td>
<td>19.0%</td>
<td>26.5%</td>
</tr>
<tr>
<td>Elect</td>
<td>28.6%</td>
<td>40.8%</td>
<td>33.5%</td>
<td>50.5%</td>
<td>70.7%</td>
<td>73.9%</td>
<td>81.4%</td>
</tr>
<tr>
<td>microwave</td>
<td>0.4%</td>
<td>0.6%</td>
<td>0.0%</td>
<td>0.1%</td>
<td>1.2%</td>
<td>5.3%</td>
<td>1.1%</td>
</tr>
<tr>
<td>Refri</td>
<td>2.9%</td>
<td>3.7%</td>
<td>2.7%</td>
<td>9.7%</td>
<td>14.4%</td>
<td>20.3%</td>
<td>18.6%</td>
</tr>
<tr>
<td>Radio</td>
<td>77.2%</td>
<td>67.8%</td>
<td>73.4%</td>
<td>75.8%</td>
<td>76.9%</td>
<td>83.6%</td>
<td>80.1%</td>
</tr>
<tr>
<td>television</td>
<td>12.8%</td>
<td>26.3%</td>
<td>12.3%</td>
<td>29.6%</td>
<td>42.7%</td>
<td>41.8%</td>
<td>60.7%</td>
</tr>
<tr>
<td>Car</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.0%</td>
<td>0.7%</td>
<td>0.8%</td>
<td>2.2%</td>
<td>3.2%</td>
</tr>
<tr>
<td>ovehicle</td>
<td>8.8%</td>
<td>0.8%</td>
<td>2.0%</td>
<td>5.1%</td>
<td>10.0%</td>
<td>18.7%</td>
<td>11.0%</td>
</tr>
<tr>
<td>telephone</td>
<td>1.2%</td>
<td>0.1%</td>
<td>0.3%</td>
<td>1.7%</td>
<td>5.6%</td>
<td>6.4%</td>
<td>9.3%</td>
</tr>
<tr>
<td>Durval</td>
<td>2371.79</td>
<td>798.96</td>
<td>721.57</td>
<td>3257.24</td>
<td>4735.78</td>
<td>8246.78</td>
<td>5451.81</td>
</tr>
<tr>
<td>Ndur</td>
<td>2.66</td>
<td>2.71</td>
<td>2.41</td>
<td>3.19</td>
<td>4.30</td>
<td>4.97</td>
<td>5.58</td>
</tr>
<tr>
<td>Dtmail</td>
<td>64.57</td>
<td>46.96</td>
<td>54.24</td>
<td>51.97</td>
<td>39.33</td>
<td>34.28</td>
<td>29.65</td>
</tr>
<tr>
<td>Dtbank</td>
<td>59.11</td>
<td>41.75</td>
<td>42.74</td>
<td>44.44</td>
<td>37.03</td>
<td>31.84</td>
<td>29.55</td>
</tr>
<tr>
<td>dtmarket</td>
<td>78.42</td>
<td>55.48</td>
<td>66.05</td>
<td>56.97</td>
<td>46.49</td>
<td>43.90</td>
<td>34.46</td>
</tr>
<tr>
<td>Socap</td>
<td>1.67</td>
<td>1.27</td>
<td>1.76</td>
<td>1.57</td>
<td>1.62</td>
<td>1.33</td>
<td>1.48</td>
</tr>
</tbody>
</table>

Table 3.14. Description and summary statistics for variables in structural model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Source</th>
<th>Mean</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depart</td>
<td>Dependency ratio</td>
<td>ENCOVI</td>
<td>0.7832</td>
<td>2.46</td>
</tr>
<tr>
<td>Mhh</td>
<td>Dummy variable (=1 if household is male-headed)</td>
<td>ENCOVI</td>
<td>2.6314</td>
<td>6.39</td>
</tr>
<tr>
<td>Hedpr</td>
<td>Dummy variable (=1 if household head has primary education)</td>
<td>ENCOVI</td>
<td>-0.6282</td>
<td>-3.41</td>
</tr>
<tr>
<td>Hedsec</td>
<td>Dummy variable (=1 if household head has secondary education)</td>
<td>ENCOVI</td>
<td>-3.5441</td>
<td>-4.15</td>
</tr>
<tr>
<td>ethnoind</td>
<td>Dummy variable (=1 if household is non-indigenous)</td>
<td>ENCOVI</td>
<td>-1.4592</td>
<td>-3.27</td>
</tr>
<tr>
<td>monoid</td>
<td>Dummy variable (=1 if household is monolingual indigenous)</td>
<td>ENCOVI</td>
<td>0.4781</td>
<td>1.71</td>
</tr>
<tr>
<td>Elect</td>
<td>Dummy variable (=1 if household has electricity access)</td>
<td>ENCOVI</td>
<td>-1.9707</td>
<td>-4.89</td>
</tr>
<tr>
<td>Dtmail</td>
<td>Distance to mail facility</td>
<td>ENCOVI</td>
<td>0.0031</td>
<td>2.75</td>
</tr>
<tr>
<td>Socap</td>
<td>Number of social-capital committees</td>
<td>ENCOVI</td>
<td>-0.2479</td>
<td>-4.60</td>
</tr>
<tr>
<td>Popden(^a)</td>
<td>Population density</td>
<td>Census 2002</td>
<td>-0.0006</td>
<td>-1.32</td>
</tr>
<tr>
<td>popgrowth(^a)</td>
<td>Inter-censal population growth rate</td>
<td>Census 1994, 2002</td>
<td>-0.0045</td>
<td>-0.61</td>
</tr>
<tr>
<td>litrate(^a)</td>
<td>Literacy rate</td>
<td>Census 2002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>z_capacida–a(^a)</td>
<td>Soil use capacity</td>
<td>MAGA-SIG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>roadkm(^a)</td>
<td>Kilometers of road adjusted by quality</td>
<td>MAGA-SIG</td>
<td>1.0743</td>
<td>1.20</td>
</tr>
<tr>
<td>ownrent(^a)</td>
<td>Percentage of households who own or rent land</td>
<td>Census of Agriculture (2003)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>proddens(^a)</td>
<td>Proportion of population in municipio who are agricultural producers</td>
<td>Census of Agriculture (2003)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>perrate(^a)</td>
<td>Percentage of land in municipio planted to perennials</td>
<td>Census of Agriculture (2003)</td>
<td>1.9403</td>
<td>6.41</td>
</tr>
</tbody>
</table>

Source: ENCOVI (2000). Note: \(^a\) Municipio-level variable (instrument).
Table 3.15. Determinants of livelihood strategy adoption (structural multinomial logit results). Dependent variable: livelihood strategy

<table>
<thead>
<tr>
<th>Variable</th>
<th>Ag Self Employment Coeff</th>
<th>Z</th>
<th>Ag Wage Employment Coeff</th>
<th>Z</th>
<th>Mixed Ag Coeff</th>
<th>Z</th>
<th>Mixed Coeff</th>
<th>Z</th>
<th>Non-Ag Wage Employment Coeff</th>
<th>Z</th>
<th>Non-Ag Self Employment Coeff</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>26.3740</td>
<td>2.16</td>
<td>-37.0237</td>
<td>-2.65</td>
<td>15.6271</td>
<td>.</td>
<td>-4.9897</td>
<td>-0.40</td>
<td>30.9890</td>
<td>1.94</td>
<td>12.7898</td>
<td>0.98</td>
</tr>
<tr>
<td>Depart</td>
<td>-0.6713</td>
<td>-2.41</td>
<td>0.7832</td>
<td>2.46</td>
<td>-0.7951</td>
<td>-2.65</td>
<td>0.0554</td>
<td>0.19</td>
<td>-1.0440</td>
<td>-2.77</td>
<td>-0.6442</td>
<td>-2.09</td>
</tr>
<tr>
<td>Mhh</td>
<td>0.9232</td>
<td>2.49</td>
<td>2.6314</td>
<td>6.39</td>
<td>1.0636</td>
<td>2.55</td>
<td>1.2253</td>
<td>3.27</td>
<td>-0.4360</td>
<td>-0.92</td>
<td>0.6811</td>
<td>1.74</td>
</tr>
<tr>
<td>Hedpr</td>
<td>-0.1577</td>
<td>-0.92</td>
<td>-0.6282</td>
<td>-3.41</td>
<td>-0.1463</td>
<td>-0.78</td>
<td>-0.3857</td>
<td>-2.19</td>
<td>0.4824</td>
<td>2.14</td>
<td>0.6858</td>
<td>3.76</td>
</tr>
<tr>
<td>Hedsec</td>
<td>-0.0014</td>
<td>-0.00</td>
<td>-3.5441</td>
<td>-4.15</td>
<td>0.7101</td>
<td>0.86</td>
<td>-1.7079</td>
<td>-2.10</td>
<td>2.2825</td>
<td>2.42</td>
<td>1.7911</td>
<td>2.35</td>
</tr>
<tr>
<td>Ethnoind</td>
<td>0.6078</td>
<td>1.52</td>
<td>-1.4592</td>
<td>-3.27</td>
<td>0.4339</td>
<td>0.99</td>
<td>-0.4193</td>
<td>-1.01</td>
<td>0.6918</td>
<td>1.30</td>
<td>0.8734</td>
<td>2.03</td>
</tr>
<tr>
<td>Monoind</td>
<td>-0.0013</td>
<td>-0.01</td>
<td>0.4781</td>
<td>1.71</td>
<td>-0.0413</td>
<td>-0.16</td>
<td>0.1175</td>
<td>0.45</td>
<td>-0.8252</td>
<td>-2.23</td>
<td>0.2970</td>
<td>0.99</td>
</tr>
<tr>
<td>Elect</td>
<td>-0.0717</td>
<td>-0.20</td>
<td>-1.9707</td>
<td>-4.89</td>
<td>-0.0860</td>
<td>-0.22</td>
<td>-0.6936</td>
<td>-1.88</td>
<td>1.2277</td>
<td>2.49</td>
<td>0.7101</td>
<td>1.79</td>
</tr>
<tr>
<td>Dtmail</td>
<td>0.0024</td>
<td>2.45</td>
<td>0.0031</td>
<td>0.75</td>
<td>0.0007</td>
<td>0.60</td>
<td>0.0020</td>
<td>1.88</td>
<td>-0.0046</td>
<td>-2.45</td>
<td>-0.0043</td>
<td>-2.95</td>
</tr>
<tr>
<td>Socap</td>
<td>0.0663</td>
<td>1.39</td>
<td>-0.2479</td>
<td>-4.60</td>
<td>0.0967</td>
<td>1.85</td>
<td>-0.0466</td>
<td>-0.92</td>
<td>-0.0460</td>
<td>-0.73</td>
<td>-0.0086</td>
<td>-0.18</td>
</tr>
<tr>
<td>Popden</td>
<td>-0.0006</td>
<td>-1.07</td>
<td>-0.0006</td>
<td>-1.32</td>
<td>-0.0012</td>
<td>-2.20</td>
<td>-0.0004</td>
<td>-0.81</td>
<td>0.0005</td>
<td>1.14</td>
<td>0.0002</td>
<td>0.59</td>
</tr>
<tr>
<td>Popgrowth</td>
<td>0.0101</td>
<td>1.67</td>
<td>-0.0045</td>
<td>-0.61</td>
<td>-0.0018</td>
<td>-0.25</td>
<td>0.0088</td>
<td>1.28</td>
<td>-0.0195</td>
<td>-2.01</td>
<td>0.0045</td>
<td>0.64</td>
</tr>
<tr>
<td>Roadkm</td>
<td>-1.4940</td>
<td>-1.51</td>
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Source: ENCOVI (2000). Note: Endogenous variable
Table 3.16. Determinants of household land access (structural tobit results). Dependent variable: access to land (owned and rented)

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<td>Socap</td>
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<tr>
<td>Popden</td>
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<tr>
<td>popgrowth</td>
<td>0.0608</td>
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<tr>
<td>ownrent</td>
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<tr>
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<tr>
<td>surorient</td>
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<tr>
<td>suroccidente</td>
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<td>emp6a</td>
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<td>emp7a</td>
<td>-4.3705</td>
</tr>
<tr>
<td>plconsa</td>
<td>-3.0469</td>
</tr>
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</table>

Source: ENCOVI (2000). Notes: aEndogenous variable. Emp1-7 are the endogenous employment/livelihood strategy classes (endogenously determined). Because class 5 is deleted from this structural regression, it is the comparison class. The variable plcons is predicted (instrumented) log consumption per capita, also endogenous.
Table 3.17. Determinants of log consumption (structural model results). Dependent variable: log household consumption per capita

<table>
<thead>
<tr>
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<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>_cons</td>
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<td>Depart</td>
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</tr>
<tr>
<td>Mhh</td>
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<td>Hedpr</td>
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<td>6.18</td>
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<tr>
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<td>0.2518</td>
<td>8.06</td>
</tr>
<tr>
<td>monoind</td>
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<td>-3.39</td>
</tr>
<tr>
<td>Elect</td>
<td>0.2533</td>
<td>10.39</td>
</tr>
<tr>
<td>Dtml</td>
<td>-0.0003</td>
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</tr>
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<td>Socap</td>
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</tr>
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<td>Peten</td>
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<td>emp1a</td>
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<td>emp2a</td>
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<td>emp3a</td>
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<td>pacea</td>
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Source: ENCOVI (2000). Notes: aEndogenous variable. Emp1-7 are the endogenous employment/livelihood strategy classes (endogenously determined). Because class 5 is deleted from this structural regression, it is the comparison class. The variable pace is predicted (instrumented) land access per capita, also endogenous.
## Table 3.18. Characteristics of farm families by Agricultural Region

<table>
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<tr>
<th>Variable</th>
<th>Description</th>
<th>Agricultural Region</th>
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<td></td>
<td>None</td>
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<tr>
<td>Landaccess</td>
<td>Land owned + rented, in hectares</td>
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</tr>
<tr>
<td>Irrdum</td>
<td>Percent with access to irrigation</td>
<td>15.8%</td>
</tr>
<tr>
<td>Irrarea</td>
<td>Average area under irrigation</td>
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</tr>
<tr>
<td>Fruit</td>
<td>Producing fruit</td>
<td>3.0%</td>
</tr>
<tr>
<td>Ntx</td>
<td>Producing non-traditional exports</td>
<td>2.6%</td>
</tr>
<tr>
<td>Tx</td>
<td>Producing traditional exports</td>
<td>27.0%</td>
</tr>
<tr>
<td>Hort</td>
<td>Producing horticulture crops</td>
<td>9.7%</td>
</tr>
<tr>
<td>Pseeds</td>
<td>Purchase seeds</td>
<td>17.4%</td>
</tr>
<tr>
<td>Porgfert</td>
<td>Purchase organic fertilizer</td>
<td>20.0%</td>
</tr>
<tr>
<td>Pchem</td>
<td>Purchase chemicals</td>
<td>39.7%</td>
</tr>
<tr>
<td>Pothers</td>
<td>Purchase other inputs</td>
<td>18.4%</td>
</tr>
<tr>
<td>Dtech</td>
<td>Access to technical assistance</td>
<td>3.7%</td>
</tr>
<tr>
<td>Dfieldday</td>
<td>Attended field day</td>
<td>2.8%</td>
</tr>
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</table>

Table 3.19. Regression results: determinants of farm household well-being. Dependent variable: log consumption per capita

<table>
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<tr>
<th>Coef.</th>
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<th>Coef.</th>
<th>t</th>
<th>Coef.</th>
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Figure 3.1. Differences in density of well-being. Each Region density subtracted from that of the entire rural sample

Figure 3.2. Differences in density of well-being attributable to education of the household head. Density of the entire rural sample subtracted from that for each head education level.

Source: ENCOVI (2000). Vertical line represents the poverty line. Horizontal line represents the zero point where the density of each distribution is identical to the density of the comparison distribution.
Figure 3.3. Differences in density of well-being attributable to education of the household head. Density of the entire rural sample for households headed by someone with primary education subtracted from that for each region with the same head education level.

Figure 3.4. Differences in density of well-being attributable to education of the household head. Density of the entire rural sample for households headed by someone with secondary education subtracted from that for each region with the same head education level.

Figure 3.5. Well-being density and differences, actual and with improved road access

Source: Simulated using ENCOVI (2000).
Figure 3.6. Actual and reweighted distribution of well-being and density differences. Reweight reflects patterns of educational attainment in urban areas.

Source: Simulated using ENCOVI (2000).
APPENDIX 4

Summary Report:
Guatemala Rapid Asset and Livelihood Participatory Assessment:
San Marcos and Huehuetenango

Paul B. Siegel (Consultant, World Bank and FAO/CP)

with assistance from:

Ricardo Arias (Consultant, World Bank)

Carlos Gonzalez (Consultant, ASIES)

Amy Kirkeley (Consultant, World Bank)

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42 The findings of this background paper are used as inputs in the World Bank research project, Drivers of Sustainable Rural Growth and Poverty Reduction in Central America, Guatemala Country Case Study.
1. **Description of objectives and methods**

A rapid asset and livelihoods participatory assessment was carried out in the Departments of San Marcos and Huehuetenango in April 2004. It was carried out using rapid appraisal methods anchored in the asset-based approach applied in the “Drivers of Growth Study” (see figure 4.1). Information was collected regarding the current situation and about perceived changes that have taken place in household assets, the policy/institutional and risk context, livelihood strategies and well-being outcomes since signing of the Peace Accords in 1996.43

The major objectives of these participatory exercises were to:

- identify key assets for growth and poverty reduction, this includes newly acquired assets and “missing” assets,
- better understand the combinations, sequencing and complementarity of physical infrastructure assets (e.g., roads, electricity, water and sanitation, information technology), social infrastructure (e.g., education, health) and productive assets (e.g., technical assistance to build human and social capital, finance, etc.) and the role of attitudes, social dynamics and culture in determining “optimal asset portfolios”, and
- better link assets and livelihood strategies with desired outcomes from the perspective of community members.

Two types of participatory exercises were carried out in April 2004. Community-based group meetings were held in 21 communities located in the Departments of San Marcos and Huehuetenango. See figure 4.2 for a list of communities. A regional workshop was held in San Marcos with representatives of the respective communities (representatives from 18 of the 21 communities visited attended).

The study team consisted of World Bank consultants: Paul Siegel, Ricardo Arias, Martin Carnap, Carlos Gonzalez, and Amy Kirkley. MAGA was represented by Danilo Agustin Gonzalez Arauz and Noe Francisco Mencos de Leon. INFOM was represented by Juan Carlos Morales Mendes, Otto Israel Palacios Caniz, and Israel Navarro. FAO was represented by Estibaliz Morras Dimas and Aura Lopez Gomez. Plataforma Agraria was represented by Jose Luis Avilar. Irma Yolanda Avila (World Bank- Guatemala), Cecilia Claudia Corvalan (World Bank – LAC Rural Infrastructure) and Jeff Alwang (consultant) participated in the regional workshop and presentation.

2. **Description of communities selected and the study area**

2.1. **Selection criteria for communities and workshop participants**

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43 Instead of focusing attention on the impacts of specific World Bank projects -- as was the case for project stocktaking exercises carried out as part of the Drivers of Growth study in Nicaragua and Honduras -- the study team adopted a broader perspective to better understand how investments in assets and changes in livelihoods affected household well-being.
The first criterion for selection of communities was the identification of municipalities in the Departments of San Marcos and Huehuetenango that were targeted as pilot municipalities for the proposed Western Altiplano Natural Resource Management (MIRNA) Project. This set of municipalities was narrowed based on logistical considerations so that team members could cover a larger number of communities, and allow community representatives to travel to San Marcos to participate in the regional workshop. Within the selected municipalities in San Marcos and Huehuetenango, a range of communities was selected to reflect the existence or absence of current or planned World Bank projects, notably Rural Roads I (in San Marcos) and the proposed Rural Roads II (in Huehuetenango), PDL-FONAPAZ (social funds), and the Land Fund Project. Irma Yolanda Avila (World Bank Specialist for Indigenous Peoples and Gender in Guatemala) and representatives of MAGA and INFOM helped select the communities. The selection of communities is not statistically representative of the region, but attempts were made to select representative communities. Overall, 6 municipios and 16 communities in San Marcos, along with 2 municipios and 5 communities in Huehuetenango were selected.

Participants at the community workshops were selected by local government officials (e.g., alcaldes and aldeas) and community leaders. They represent primarily agriculturally-oriented producers, not the poorest individuals/households of the communities, not those who speak only indigenous languages, and not the most physically isolated communities. For the regional workshop, each community was asked to send two representatives – one male and one female. Participants in the community and regional workshops were not statistically representative of the communities. The study team hypothesized that the poorest and richest households were not represented, and that there was a bias for participants to be more oriented toward agricultural activities than the entire community. For the regional workshop in San Marcos, representatives from 18 of the 21 communities attended. Considering the distances that needed to be travel, this high level of participation indicates the high motivation on behalf of participants, which in turn -- one can hope -- is an indication that the community visits were highly valued.

2.2. Some attributes of the Departments of San Marcos and Huehuetenango

The Departments of San Marcos and Huehuetenango are characterized by high poverty rates and high poverty densities, and a high proportion of indigenous people. Thus poverty is widespread among these fairly highly populated, though rural, areas. Rural areas in these Departments, like many others in Guatemala, have historically been characterized by deep inequalities, social and political exclusion, physical isolation, and weak and non-responsive institutions, etc.

The major urban areas of San Marcos and Huehuetenango are fairly well connected to the major road networks, and the road density within the Departments is relatively high for rural Guatemala. However, the terrain is mountainous and steeply sloped, mostly at elevations of

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44 Rural Roads I was implemented by INFOM, and INFOM is expected to implement Rural Roads II.  
45 At the end of the community meetings, attendees were informed that there would be a regional workshop in San Marcos the following week. The community group could choose its representatives. Prospective workshop attendees were told they would receive reimbursement for travel, food and lodging for the two day workshop.  
46 Poverty rates reflect the percentage of poor in the overall population, whereas poverty density reflects the amount of poor persons per geographical area (poor people/square kilometer).
2500-3500 meters, and difficult to transverse. Many roads are in poor condition and passable only for parts of the year. Thus internal road access within the Departments is relatively poor.

Rainfall and access to water resources varies widely over the Departments. Thus agricultural potential is heterogeneous. The terrain and rainfall conditions are conducive to forests, and in general, the two Departments are well endowed with forests, despite significant deforestation. However, access to much of the forested areas is very difficult, and the distribution of forests is uneven. The major economic activities in the Departments revolve around agricultural production (crops, livestock, forest products), mostly for self-consumption (major staples are maize, beans, potatoes). Most households have access to less than 1 manzana (0.7 hectare) of land. Population growth and parcelization of family landholdings is exacerbating pressure on the land-water-forest natural resource base. Since signing of the Peace Accords in 1996, the Government of Guatemala has made major investments in basic infrastructure including roads, electrification, schools, health clinics, and potable water.

3. Summary of findings from the Community and Regional Workshops

3.1. Livelihood strategies

Based on information obtained at the community workshops, two major livelihood groups were identified, with two livelihood sub-groups in each major group.

Livelihood Group I: Households producing agricultural products (crops, livestock, forestry) primarily for self-consumption with periodic (mostly ad hoc) sales.

IA. Households with limited off-farm opportunities and low returns for such activities.

IB. Households with more off-farm opportunities and higher returns for such activities.

Livelihood Group II: Households producing agricultural products (crops, livestock, forestry) for own-household consumption, with a significant part of production activities that are market-oriented.

IIA. Market-based production consists mostly of traditional crops/livestock/forestry products (the major traditional crop for market is potatoes).

IIB. Market-based production consists mostly of non-traditional products, notably horticultural crops (e.g., vegetables, fruits, flowers, dairy).

Of the 21 communities visited, the study team characterized 14 communities in Group I (8 in Group IA and 6 in Group IB) and 7 communities in Group II (4 in Group IIA and 3 in Group IIB). For the regional workshop, attendees were divided into four groups:

Workshop Group A: Livelihood Group IA
Workshop Group B: Livelihood Group IB
Workshop Group C: Livelihood Groups IIA and IIB
Workshop Group D: Women’s Group (all women attendees).

Not all participants in the workshops nor all residents of the communities depend on agriculture as their major livelihood. Some pursued other non-agricultural livelihoods, such as teachers, drivers, grocery shop owners. The above livelihood groups were based on the major livelihood strategies identified.

Agriculture is the major economic activity for households in Group I, but because of a number of factors (highlighted later), most of this agricultural production is for self-consumption. Products include basic grains such as maize and beans, and small animals such as chickens and pigs. In most cases, self-production does not cover annual food requirements. Some sales take place during harvest season to generate cash, and periodic sales take place during the year, depending on harvest levels and commodity market prices. In many cases, households in Group I are located in areas with lower quality soils and/or difficult elevation/slope conditions, and/or less dependable rainfall and access to water for irrigation.

Households in Group IA and IB seek off-farm agricultural and non-agricultural activities. However, households in Group IA tend to have more limited opportunities and/or lower returns for selected activities, whereas households in Group IB seem to be better able to identify better opportunities with higher returns. Households in Group IA tend to work for larger farmers in the community and in fincas located near the community, with some seasonal migration to coffee plantations, and/or other plantations along the Southern Coast. Such options for off-farm employment have become scarcer in recent years because of lower labor demands resulting from the coffee crisis and lower prices for other commodities. Households in Group IA also seek out employment in construction and other low- and/or semi-skilled occupations and services. Women in livelihood Group IA, in general, concentrate their efforts on housework and caring for children and small animals, along with obtaining water and fuel-wood, and other byproducts for fuel, fodder, wood and natural fertilizers. Children are often taken from school at a relatively age to assist parents in their livelihood activities, and if attending school also contribute time to economic tasks such as weeding, harvesting and household activities such as care for children, food preparation, laundry and cleaning. In essence, most households in Group IA have livelihood strategies entirely devoted to covering basic needs.

In contrast, households in Group IB tend to have more options and higher returns for their activities outside of agricultural production, notably for migration activities. A relatively high share of households in Group IB has a male family member who has had a “successful” migration strategy to Mexico or the United States. Participants reported that coffee laborers in Guatemala earn about Q15-20 (US$2-3) per day without food, whereas in Chiapas, Mexico they can earn Q40-50 (US$5-6) per day plus meals as coffee laborers (and even more in the United States).

47 “Success” in this context means that the person managed to migrate, make some money and return home. In some cases persons with difficult initial experiences with migration are easily able to temporarily migrate when needed. However, in other cases, they are not. Thus, the sustainability of migration as a livelihood strategy for generating additional income is questionable under current conditions.
A pattern of migration has emerged, with successful migrants having the resources to invest in pick-up trucks, cell phones, improved housing, and grocery stores, and to purchase inputs for their agricultural production. However, there was no clear evidence of households in Group IB using wages from migration or remittances to significantly invest in productive assets for crop production, or to change the crop-livestock-forestry production mixes or to adopt new technologies. There were, however, some reports of returning migrants using some of their earnings to purchase land.

This primarily male migration strategy imposes an important social cost: that of leaving women alone to take over agricultural duties in addition to caring for and protecting the children, house, animals, and land. On the other hand, there are important positive externalities associated with migration, since community members with transport and communication assets rent them out to others in the community. There seems to be an important social capital dimension for migration to Mexico and the United States, whereby community members assist one another with information and networking on the how and where to migrate, find employment, and settle in.

Besides migration, there are households engaging in commercial activities (buying and selling activities), and micro-enterprises such as bread making, crafts, workshops, rope-making. As mentioned, those who participated in community visits and regional workshop seem to over-represent households with primarily agricultural-based livelihoods. More information is needed on non-agricultural activities.

Although households in Group II devote the majority of their assets to producing agricultural products for home consumption, they also devote significant resources to market-oriented agricultural production. In many cases, both male and female household members work in the various agricultural activities. These communities often have higher levels of organization of both women and men for activities ranging from producer groups, to obtaining irrigation systems and stoves. Many household members engage in non-agricultural activities in the community (commercial activities and micro-enterprises) and migration. These non-agricultural activities are often planned in a manner that allows cash income from these activities to help finance the market-oriented agricultural activities such as purchase of inputs, marketing costs. However, it was noted that many households in Group II have actually decreased their dependence on off-farm activities to specialize more in market-oriented agricultural production. Besides soil quality and the elevation/slope of fields, the presence of micro-irrigation is key for determining whether households produce rain-fed traditional crops such as potatoes or produce irrigated horticultural crops such as vegetables, flowers, fruits. Irrigation also allows farmers to produce more than one crop per year on limited landholdings, and lowers the risks associated with droughts.

In general, changes have been occurring in livelihood strategies practiced by households in Group I and II. For example, the production of wheat has declined because of low market prices, increasing input costs, and disease/pest problems. Crop rotations and technologies such as use of improved seed, fertilizer, agro-chemicals have also tended to change as a function of...
changing output and input prices and the decreasing sizes of household land parcels (due to parcelization of plots to distribute to children).

The tendency toward more intensive land cultivation (less use of fallow and preventative crop rotation practices) and economizing on fertilizer and agri-chemical inputs has, in many cases, led to lower productivity and higher incidence of diseases. In addition, as forest resources have been declining (as losses from forest harvests are greater than gains from reforestation), many households have been devoting more time to collecting fuel-wood for household energy consumption and other energy needs (e.g. making adobe bricks) and forest by-products for fodder and natural fertilizer. Likewise, in many communities, especially (but not only) those without potable water, the time needed for collecting water has increased. Another change in livelihood strategies is related to migration. Households in Group I are increasingly seeking non-agricultural employment and activities, while households in Group II are increasingly depending on their agricultural production and/or non-agricultural activities that are community-based.

There was not much discussion regarding land tenure and land security issues. Within communities, it seems that the family landholdings are recognized within the community, but communities apply different land use systems: some have communal pasture and forest land and others have private landholdings. Within communities, there were many examples of rather large differences in landholding size. Most rural households in the Western Altiplano do not have legal land titles. This lack of legal land title constrains access to formal credit. Of more concern to respondents than lack of legal title was their shrinking natural resource base, and the intra-community allocation and regulation of these resources.

In general, women participated in economic and social activities more actively in households and communities in Group II. In all cases, women are very busy year-round with caring for children, cleaning the household, preparing meals and gathering food and water. Figure 4.3 illustrates women’s daily activities. Women at the workshop claimed that they work from the time they wake at 5am until 9pm when their children fall asleep. With an average of four children each, female workshop participants described little rest and relaxation time, savoring the moments when they can listen to the radio, go to church or talk with their friends. Those women with more initiative, who are coping with widowhood, and/or who are living in more economically active communities, tended to spend more time working outside the home. In addition to the traditional workload, women also work in the fields, carry goods to and from market, make crafts (such as lassos) and participate in women’s groups (including a milk producers’ association and irrigation committee). Some younger women, women with fewer children and women faced with economic necessity also migrate for employment opportunities. In the past, women in many communities migrated with their entire families to the Southern Coast or to Mexico to work on plantations. Nowadays, fewer women are migrating in many communities, although some work as a domestic laborer in Mexico.

### 3.2. Key assets for determining livelihood strategies

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48 There was a general tendency for large landholders to rent out their land to others, and possibly to be absentee landlords.
Since the major livelihood strategies of households are related to agriculture (along with obtaining water and fuel-wood), it is clear that natural resource assets (particularly the combination of land-water-forest resources) are a major determinant of opportunities and constraints. As mentioned, there is a great deal of heterogeneity between communities and even within communities. Major factors include: size of the household’s land parcel, soil quality and fertility, elevation and slope of fields, rainfall total and distribution through the year, availability of water for consumption and irrigation, and quality/quantity of and proximity to forest resources and their role in soil/water conservation. The vast majority of households in Groups I and II have access to less than 1 hectare (about 10-20 *cuerdas* of agricultural and/or pasture and/or forest land -- which is about half of their parents’ landholding size or less. Under the best of circumstances this is barely enough land to produce all the basic grains and other foodstuffs needed for household consumption. Some fields have better agro-ecological conditions (soil quality and fertility, elevation/slope, water accessibility) and better agricultural potential. Also, risks such as market-related and production-related risks, and different dangers and threats are critical factors influencing livelihood strategies, along with asset accumulation and/or depletion, and household well-being.

Another key asset for determining livelihood strategies is human capital -- although not necessarily formal school education. Many households in Group II have received some technical assistance and capacity building for both production and marketing. In some cases, producers enter into contracts with buyers (and/or input suppliers) that provide a package of complementary assets: credit, technical assistance, and marketing services (usually at a pre-determined price). As mentioned, it seems that women from households in Group II had greater participation in economic and social activities (although the causality is not clear).

Despite the limited role of education in increasing household well-being in the short-term, there was a general pattern of households encouraging their children (boys and girls) to obtain a higher level of education (at least primary). A problem with post-primary education for children is the distance and costs associated with attending secondary schools outside of the community, since most communities only have a primary school. Another problem is the general lack of employment opportunities in the communities for more educated persons.

Physical accessibility to markets to sell outputs and purchase inputs and to access labor markets was also an important determinant for livelihood strategies. Interestingly, it seemed most important for households to have some “minimal” physical access to markets. That is, relatively easy and close access to a rural road or highway was more important than being directly connected to a rural road or highway. Thus, some communities not directly connected to a rural road or highway have been more market-oriented than better-connected communities. These households tended to have more advantageous natural resource conditions, experience-based knowledge and skills and access to complementary productive, social and locational assets. Households generally lacked access to communication infrastructure and information, although the proliferation of rural electricity has allowed more households to access information.

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49 Very large ranges of landholdings were reported within communities. Some households have considerably more land than average and some have extremely little or no land. It was reported that some of the larger landholders rent out their land to smaller landholders.

50 Such contracts exist for some producers of horticultural crops such as broccoli and Brussel sprouts.
via radios and televisions. There has been some proliferation of cell phones (mostly in communities in Groups IB and II).

Somewhat surprising was the seeming lack of producer organizations in communities with large numbers of producers specializing in a few key agricultural enterprises. In most cases these producer groups were organized by external forces such as project facilitators or NGOs in the context of a specific project or program. There was also a lack of community groups to deal with risks and other problems related to agricultural production (including deforestation). The lack of producer groups can be contrasted to the existence of committees to deal with basic infrastructure (often a necessity to access basic infrastructure projects). See box 4.1.

**Box 4.1. Social capital: Groups and organizations**

Many communities have a variety of groups and organizations. However, it seems that many of these groups have been organized for specific projects such as transport, education or health committees for road, schools or clinics -- possibly as a condition for qualifying for assistance. On the other hand, there seemed to be a lack of producer groups and/or groups to deal with major risks/threats identified by community residents such as lack of market access and information, lack of water access, deforestation. Attitudes towards groups and organizations have been changing since signing of the 1996 Peace Accords. On the one hand, groups and organizations are not viewed as a “leftist ideological threat”, while on the other hand they often are a pre-condition to access project benefits.

The long running civil war strongly impacted indigenous communities in the Western Altiplano. In the struggle between the army and the insurgency, the social fabric was torn apart, inter-ethnic trust was severely damaged, and community organizations and local power structures were undermined (on the other hand, in some cases the conflict strengthened inter-community relations. The signing of the Peace ended most of the overt conflict and established a framework for development. While peaceful community relations and organizations are slowly re-emerging, there is still very little trust in public institutions (World Bank 2003a)

More attention needs to be devoted to better understanding and facilitating formation of groups and organizations (and also strengthening existing ones). Participants recognized their lack of capacity to organize for income generating activities. One constraint to groups and organizations, noted by some workshop participants, was the lack of a communal multi-purpose hall.

For households adopting livelihood strategies in which migration is important, human and social capital are important assets. “Successful” individual and community experiences with migration were enhanced by and, in turn, enhance human and social capital, and also provide a critical source of financial assets.

The existence or absence of basic social infrastructure such as schools and health clinics, water and sanitation, communal halls, and electricity and roads have an important influence on the efficiency of natural, human/social and financial assets used for different livelihood strategies, and can also increase household livelihood opportunities.

The study team did not detect any clear sequencing patterns for assets. The more “successful” households and communities had diverse portfolios of assets and experiences. For
example, a community with tri-phase electricity had 15 carpentry workshops. However, in this community there was a tradition of carpentry shops using manual tools before they were connected into the electrical grid. Access to electricity facilitated an expansion of the existing activities and changes in technology, even though this community still lacks year-round access to roads (even entry and exit to the community are limited during rainy season). In another community with a history of broccoli production for domestic and export markets, road access was relatively poor, but this has not prevented community members from successfully producing and marketing broccoli. However, the community benefited from a mini-irrigation project initiated over ten years ago, when it began growing horticultural crops for market. A road should make community members more competitive by cutting transport and transaction costs and possibly opening up new markets. Thus it seemed that communities benefiting the most from new or expanded infrastructure were already involved in some market-oriented activities, and the improved infrastructure expanded these existing activities and opened up new opportunities. Communities in Group I, however, did not seem to have much of a supply response following improvements in infrastructure.

3.3. Key risks, dangers and threats influencing asset use and livelihood strategies

In general, participants perceived a significant exposure to risks, dangers and threats and identified a fairly long list of such factors that influence their accumulation and allocation of assets and selection of livelihood strategies, and ultimately their well-being. Many of these risks/dangers/threats are actually inter-related, and risk/danger/threat management strategies need to take these linkages into consideration.

There is a strong perception that the lack of good physical year-round access to markets is a major problem, and that poor physical access to roads also hinders access to health clinics and schools located outside of the community. Many communities face serious problems of physical access to roads during the rainy season, when all or part of many secondary and tertiary roads are not passable, or are very difficult to navigate. Seasonal problems with access to roads have an important influence upon decisions regarding the types of crops to grow and the inputs to use, and when/where products are marketed (especially when, as in most cases, storage and processing facilities are lacking). In general, the lack of physical access has been a disincentive for greater market orientation of agricultural and other activities.

Another major problem cited by participants were risks related to prices of agricultural inputs and products. There was a general perception that prices for products have been declining and costs of inputs increasing. This has led many farmers to decrease use of improved seed varieties, fertilizer and agri-chemicals. Besides their direct effect on households engaging in agricultural activities, the lower product prices and higher input costs have also impacted labor markets. Off-farm employment opportunities and/or wages have declined in many cases. Another dimension of the problems related to prices is the lack of information on alternative markets where higher output prices and lower cost inputs might be obtained, and/or the potential

51 Tri-phase electricity supplied by an electricity company requires three hot wires and pole transformers and therefore increased installation and maintenance costs. Mono-phase electricity requires only one hot wire and one transformer, but only provide enough power for household appliances. To save money, many communities far from a major electrical grid have received mono-phase connections.
might exist for engaging in alternative enterprises. Problems associated with lack of physical access to roads and markets and lack of information on product prices and input costs are interrelated. Accordingly, improved market information and physical access to markets should be dealt with in an integrated manner.

Livelihood strategies are also influenced by national and international policies and economic trends. Changes in policies over the past years, notably trends toward market and trade liberalization, have magnified peoples’ perceptions about price risks and the challenges of a competitive market economy. There is considerable uncertainty and anxiety about how these changes are impacting the rural economy.

Related to changes in the policy context are concerns about the risks associated with (illegal) migration, especially to the United States following the September 11, 2001 terrorist attacks. Sending of remittances also involves risks and dangers, and can be relatively costly and insecure. There are additional risks associated with remittances because of concurrent anti-drug and money laundering efforts to track down foreign transfers. Thus, US and Mexican migration policies and policies affecting the sending of remittances have an important impact on livelihood strategies of many households.

Drought was identified as a major risk, along with problems related to the lack of dependable access to clean drinking water and water for irrigation. There is a perception that rainfall patterns have become more erratic and that it rains less, on average. At the same time, there is a perception that access to water resources is becoming more difficult. One problem is that some communities were beneficiaries of potable water and sanitation projects and/or irrigation projects before the Peace Accords and the existing water and sanitation infrastructure and services are inadequate as populations have grown. Also, greater competition for water resources within and between communities, and problems related to deforestation and erosion are impacting water and soil availability and quality – thereby threatening environmental sustainability. Besides drought, another climatic risk is frosts. Many communities are located at high elevations, and frosts influence land use patterns and the yields of different crop/livestock strategies.

Besides drought many participants noted risks associated with plant and animal diseases and pests (which are sometimes related to weather risks such as droughts and flooding). Furthermore, there was a perception that risks from plant and animal diseases have been increasing in recent years. This could be due to a variety of reasons, including declining use of improved seeds, fertilizer and agri-chemicals, changing crop rotations (largely as a response to shrinking household parcels), global climatic change, and deforestation. Some attempts to deal with these disease and pest problems have been made by households, and in some cases coordinated activities have been undertaken at the community and/or municipal levels (e.g., community fumigation). There is an appreciation that collective action is needed to deal with communicable diseases and pests. However, there was not much evidence of community level organizations and planning to deal with such risks (see box 4.2).
Deforestation, soil erosion and sedimentation of watersheds were highlighted as a major threat faced by individual households, the community and other communities in a common watershed. Use of forest resources for household energy (cooking and heating) and for some micro-enterprises such as carpentry, construction, brick making, bread making has led to deforestation, as only limited reforestation takes place. In some cases communities and/or municipalities have established regulations on forest harvesting and replanting and/or established tree nurseries. Increasing deforestation has negative impacts on soil erosion and sedimentation of watershed areas, which in turn influence rainfall patterns and accessibility of water resources. The lack of more efficient wood burning stoves is a problem, and most households use stoves that are inefficient and polluting, which translates into higher household labor demands for fuel-wood harvesting, and health problems associated with inhaling of smoke and fumes.

A major threat acknowledged in all of the communities is the continuing parcelization of household landholdings. High birth rates and a fairly fixed amount of household landholdings (at any time) has lead to declining landholding sizes. This shrinking land base is perceived as a major constraint to agriculture as a major source of household food security and possibly as an “engine of growth.” Taken together, shrinking landholdings, deforestation, soil erosion and sedimentation of watersheds, problems related to drought and water access, and low prices for agricultural products – these factors challenge not only the agricultural growth potential and possible poverty reduction, but also the sustainability of any positive changes.

Human illnesses were also viewed as an important, and exacerbated by the lack of good and dependable health services. Problems cited include distance to a health clinic, lack of health staff at clinics, and lack of medicines. Women emphasized how other risks, such as drought and access to water, plant and animal diseases and pests, and poor road access are inter-related with health risks. Similarly, despite the wide expansion (and nearly universal existence) of community primary schools, there is concern about teachers not being well-trained and the limited relevance of the curriculum and quality of studies.

Another concern expressed by many participants was physical insecurity, which was associated with increasing robberies. Although it was perceived that the overall security situation had greatly improved since signing of the Peace Accords in 1996, including security within the community, there were concerns about physical insecurity when traveling outside of the community.

Box 4.2. Can plant and animal health promoters be patterned after health promoters?

In Guatemala, some programs have used semi-skilled persons to help in provide health services to remote communities. These persons (called “promoters”) are trained to diagnose and sometimes deal with common illnesses. Such a program could be considered for plant and animal health. Persons could be trained to identify plant and animal diseases and pests (and notify better trained specialists), and also to help in the prevention and eradication of such diseases and pests. In addition, communities should have Plant and Animal Health Committees to plan and implement community-wide efforts, since there the prevention and eradication of such diseases and pests usually requires a community-wide response.
At the regional workshop, each group was asked to list and prioritize the major risks they face. Table 1 presents a list of risks/dangers/threats compiled by the study team based on information provided by participants.

### Table 4.1. Major risks/dangers/threats identified by workshop participants

<table>
<thead>
<tr>
<th>Risk #</th>
<th>Group A</th>
<th>Group B</th>
<th>Group C</th>
<th>Women’s Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Access to water and drought</td>
<td>Deforestation</td>
<td>Market prices</td>
<td>Human health</td>
</tr>
<tr>
<td>2</td>
<td>Access to roads</td>
<td>Diseases and pests</td>
<td>Access to roads</td>
<td>Access to water and drought</td>
</tr>
<tr>
<td>3</td>
<td>Market prices</td>
<td>Drought</td>
<td>Diseases and pests</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Market prices</td>
<td>Drought</td>
<td></td>
<td>Human health</td>
</tr>
</tbody>
</table>

As observed, there is a great deal of similarity in the major risks identified by the different groups. The most commonly mentioned risks/dangers/threats were:

- Illnesses and lack of health clinics and services
- Diseases and pests of plants and animals
- Drought and lack of access to water for drinking and irrigation
- Lack of access to roads and markets
- Fluctuating and/or low market prices
- Deforestation

### 3.4. Perceptions of household well-being: Changes since 1996

In general, there was a perception that household well-being had improved, to some extent, since the Peace Accords in 1996. Participants indicated improved well-being with respect to food security, cash income, health and education – although there was ambiguity about improvements in the quality of health and education services. More significant positive changes were perceived for self-esteem, participation in economic/social/political activities and overall empowerment; and most notably for women (as observed by women and men and highlighted in box 4.3). For example, the fact that both boys and girls attend school was a source of great pride. In addition, there was an overall perception of greater hope for improvements in well-being for the future. However, there was also a recognition that life is increasingly complicated and risky and that households are vulnerable to reversals in their welfare. A major and highly “visible” threat to future livelihoods and well-being is the shrinking land-water-forest resource base. The only measure of well-being that participants consistently indicated was worse in the present than in the past was environmental quality.

The considerable investments made by the Government of Guatemala on roads, electricity, schools, health clinics, potable water, and other infrastructure have led to increased pride and perceptions of self-worth, and improved quality of life. For example, electricity has had a major and positive impact by allowing many households to enjoy the relative luxury of lighting, radio, and television (and in rarer cases, refrigerators). Another perceived benefit of electricity was that children could study at night. These demands at the household level can be
satisfied by mono-phase electricity, but tri-phase lines are needed for economic activities that require electricity (see footnote 51).

### Box 4.3. Women’s well-being: Perceptions of improvements since the Peace Accords

Both women and men identified a significant universal improvement in the well-being or quality of life of women. These included increases in participation, human rights, education and security. Women are now allowed, both by law and cultural norms, in all of the communities surveyed, to participate in community committees, including in the Community Development Councils (COCODES), and to express their views in community meetings. Many women also participate in women’s committees, focused on issues ranging from milk production to obtaining stoves, irrigation, sewing machines and potable water. They have rights by law to not only participate but also to be protected within their marriage and their community. Legal recourses include going to the mayor and the justice of the peace for issues of domestic or community violence. Officially, women are gaining rights to land and options for registering parcels in their names, however most of the women held land in the name of their husband, except widows who could then hold land in their own name.

Great gains have been made, but much work is left to be done. Women still often feel reluctant to speak, domestic violence still exists, land is still often in the name of the husband, and there is still violence and insecurity within their communities. As these laws are increasingly implemented, great hope lies in the future. Perhaps the greatest achievement, of which the women are most proud, is the education of their children. Girls are attending school in numbers nearly equal to that of boys and are learning to read and write. The difference between generations within the workshop group was dramatic, the older women never were taught to read and write, yet the younger generation were literate and confident. The accomplishments in women’s rights are notable and gains in self-esteem clearly evident, great hope lies in the future.

Besides investments by Government and other development projects, many households have experienced positive changes in the quality of their housing, the quality and quality of household implements and clothing, and personal items such as bicycles. The ability to save and invest in these assets contribute directly and indirectly to improved livelihood strategies and well-being.

### 3.5. Major investment priorities identified by workshop participants

At the regional workshop, each group was asked to list and prioritize its major priorities for improving well-being. Not surprising, there are considerable similarities between priorities identified by different groups, and most related to the major risks faced by households.
### Table 4.2. Priorities identified by workshop participants

<table>
<thead>
<tr>
<th>Priority Rank</th>
<th>Group A</th>
<th>Group B</th>
<th>Group C</th>
<th>Women’s Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Capacity building, group formation</td>
<td>Improved roads</td>
<td>Access to medicines in health clinics</td>
<td>Improved roads</td>
</tr>
<tr>
<td>#2</td>
<td>Tree nurseries</td>
<td>Community hall</td>
<td>Technical assistance, capacity building</td>
<td>Potable water</td>
</tr>
<tr>
<td>#3</td>
<td>Improved water quality</td>
<td>Improved access to potable water and irrigation</td>
<td>More participation &amp; cooperation in planning at community, government levels</td>
<td>Health clinic</td>
</tr>
<tr>
<td>#4</td>
<td>Market information</td>
<td>Health clinic</td>
<td>Seed capital for investments</td>
<td></td>
</tr>
<tr>
<td>#5</td>
<td>Technical assistance</td>
<td>Reforestation, improved stoves</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 4. Priority themes identified by the study team

Based on the community visits and workshop, the study team produced a list of priority themes. They are presented below (not presented in order of importance).

**Integrated management of land-water-forestry resources**

Improved management of land-water-forestry resources is fundamental for any strategy for food security and sustainable rural growth and poverty reduction in San Marcos and Huehuetenango. This is true for agricultural and non-agricultural activities and for rural-urban linkages. The existence of important externalities within and between communities and beyond should make this a major focus of rural development policy and public sector interventions.

There is a need to identify areas that have land-water-forest resources that can be utilized for market oriented agricultural/forestry production, areas for commercial tourism, and areas that will continue to produce primarily for self-consumption. In some areas agriculture/forestry can be an engine of growth; in others, the opportunities are much more limited. However, it is also important to consider externalities related to use and conservation of land-water-forest assets and choices of livelihood strategies. The existence of externalities justifies more public sector involvement in programs that provide public goods and services such as information on appropriate technologies (technical assistance and capacity building), and provision of tree seedlings and other plant materials to improve land-water-forest management. Loans for reforestation and conservation activities could also be considered. There is also a need for improved practices to deal with risks associated with diseases and pests, and with climatic risks such as drought, frosts and floods.

In addition, because of the externality issues involved with land-water-forestry resources, the possibility of paying rural residents for environmental services if they adopt certain soil and water conservation practices should be considered. This could be planned together with efforts...
to improve terracing of hillsides and plant soil-holding and moisture-retaining trees, shrubs, and grasses.

**Improved management of rural energy**

Closely related to management of land-water-forest resources is the management of household energy production and consumption. The Government of Guatemala has invested hundreds of millions of dollars in rural electrification. Yet, rural households still use fuel-wood for cooking and heating. In addition, many stoves for cooking and heating are inefficient wood burners and/or polluting. A more coordinated rural energy policy is needed, including research and extension into biomass production for fuel (not limited to trees) and improved stoves to increase efficiency and decrease pollution. Research should also try to identify alternative energy sources -- especially renewable ones (including electricity generated by hydro-electric plants).

It is important that an integrated energy production/consumption be adopted. A broader “biomass” perspective rather than narrow forestry perspective should be adopted. It might even make economic sense for some households with limited agricultural potential to specialize in biomass production for their own-energy needs and possibly for sale (the biomass cold also be used as feed for animals). Improving production of fuel-wood should go hand-in-hand with improvements in stoves that increase their burning efficiency and minimizing their negative health impacts. Locally produced stoves can also provide new employment opportunities.

Electricity infrastructure and services should be provided in a manner that balances household “consumption activities” such as light, radio, and television and productive activities. In many cases, rural households, especially in more remote areas are being connected to mono-phase electrical lines (as opposed to the main tri-phase electrical lines). Mono-phase electricity is sufficient for household uses, but does not provide enough power for machinery and equipment for workshops and storage facilities, but. tri-phase electricity is needed for workshops and storage facilities.

**Diversification within agriculture and outside of agriculture**

Because of its importance to the rural economy, agriculture must serve as an important engine for sustainable growth and poverty reduction, but it is not the only potential engine. More needs to be done to improve the productivity of households in Groups I and II, and to shift households from Group I to Group II. However, without a significant increase in non-agricultural activities, there is not much hope for sustainable growth and poverty reduction, or increased food security.

There is a need for greater crop-livestock-forestry diversification, including improved rotations, and to better manage risks associated with prices, weather, diseases and pests. Diversification into higher value agricultural enterprises is also needed. This is true for households depending on agriculture mostly for self-consumption and those that are more market oriented. Diversification will require better information on the natural resource base for households and communities and on potential activities production, marketing and post-harvest
activities. More attention to storage, processing, and packaging is particularly needed to target both domestic and export markets. The possibility of producing potatoes for seed (considering the special agro-ecological conditions in some areas) should be explored. There is also potential to expand dairy and cheese production. Because of their small landholdings that are often not contiguous fields, many households do not have an economically viable production unit to escape poverty. It is important to consolidate fields into economically viable production units to be competitive in the global economy.

There is also a pressing need for diversifying into more lucrative off-farm agricultural and non-agricultural activities. Some of these activities can be based in the community such as carpentry, baking dairy, and other types of workshops, construction, commercial activities, and micro-enterprises.

To facilitate diversification, there is a need for investments in complementary assets such as financial assets, education and capacity building, group formation, technical assistance, improved physical access to markets and market information, improved access to water for irrigation, and appropriate rural energy sources. Also, there is a need to improve linkages between agricultural and non-agricultural activities.

Land Reform as a partial solution and need for broader access to assets

Improved access to land can serve only as a partial solution to problems related to the current unequal distribution of natural resources. Any new policies and regulations dealing with land-water-forest management should try to improve access by the poor to these natural resources -- in a more pro-active manner.

For the landless and agricultural producers with small landholdings, there is also a need to consider programs that provide alternative productive assets, especially for individual and small group micro-enterprises. For example, a program that provides the basic machinery and equipment needed for workshops such as carpentry and woodworking, metalworking, vehicle repair, machine repair, bicycle repair, stove construction, and cloth and clothing making. In addition, training and capacity building could be provided for business skills along with technical skills required for these non-agricultural enterprises. A “turn-key” program that includes a package of machinery, equipment and training would also require appropriate financing arrangements. Clearly, many of these micro-enterprises could have important linkages to agricultural production and marketing activities.

More effective basic social infrastructure and services

There have been significant improvements in basic social infrastructure such as schools, health clinics, water and sanitation in San Marcos and Huehuetenango. However, serious problems persist in the provision of dependable and higher quality education, health, water and sanitation services. Many schools have been built (almost all the communities visited had a primary school), but the quantity and quality of teachers needs to be improved, along with the curriculum, books and other associated facilities. Rural schools need to include practical courses that can help improve agricultural productivity, and also improve the technical and occupational
skills of persons seeking work outside of agriculture. English language courses also make sense considering the global economy and migration possibilities. Likewise, despite the construction of many heath posts, a lack of health professional and medicines that constrain the improvement of health services. Health problems are often exacerbated by closely related issues such as access to clean (non-contaminated) water and nutrition.

All in all, greater complementary of social infrastructure and services is needed to increase the efficiency and effectiveness of these investments. For example, as many women participants pointed out, there needs to be greater coordination between education, health, nutrition, and water infrastructure and services to prevent diseases and improve household health.

**Recognize the importance of national and international migration**

There is a need to recognize the importance of migration, within Guatemala and outside of Guatemala, to the livelihood strategies of rural households in San Marcos and Huehuetenango. “Successful” migration strategies have improved the welfare of many households with access to limited natural assets. In many cases, migration has served as an important source of income to finance ongoing food and cash requirements, and also as an important source of finance for market-oriented agricultural and non-agricultural activities. As such, migration has been a major vehicle for changes in livelihood strategies.

However, not all migration strategies are “good” or “successful”, in fact, there is a great deal of risk associated with migration – especially illegal migration to the United States. There is also a risk of social disintegration when part of a household migrates, leaving behind other household members. In addition, the sending and receiving of remittances is often costly and risky.

The realization that migration and remittances are important issues is reaching the highest levels of government. For example, during a visit to the United States in April 2004, Guatemala’s President Berger discussed migration and remittance issues with President Bush. The Government of Guatemala needs to consider policies and programs that can facilitate legal temporary migration to the United States, provide information on labor markets in Mexico and the United States, provide some basic training for prospective migrants (including their legal rights), and improve financial systems to lower the transaction costs and risks associated with remittances.

**Access to information, technical assistance, capacity building, group formation**

Better access to information on prices of products and inputs, alternative production and marketing options, and appropriate technologies are needed to improve the efficiency of production and commercialization. This is critical for households trying to maximize returns from a relatively meager portfolio of assets and facing relatively high transactions costs due to remoteness and dispersion of populations.
Technical assistance and capacity building are key for knowing what information is needed and how to use the information. Improved access to communication infrastructure and services such as telephones, cell phones, and the internet are critical.

Technical assistance and capacity building are essential to help adults increase their human capital, and better utilize their other assets. Improving social capital through the formation of groups and collective action are also key for small producers to achieve economies of scale in production and marketing activities, as well as activities that protect the environment and vulnerable groups.

There is a need for an assessment of information, technical assistance, capacity building and group formation needs; and to design policies, projects, programs that combine the public and private sectors. Workshop participants from some communities claimed that the lack of a multi-purpose community hall constrained the formation of groups and organizations.

**Physical access to roads and markets**

Given its very difficult terrain, households and communities in San Marcos and Huehuetenango face a serious challenge to being competitive in domestic and global markets. It is not practical to cover the Departments of San Marcos and Huehuetenango with roads. On the other hand, as women participants often pointed out, improved access to roads should also be viewed in terms of improving access to health and education infrastructure and services located outside the community.

More planning is needed to consider how to best improve physical access to roads (including secondary and tertiary roads and trails) and markets and other essential infrastructure and services. A broader regional (“territorial”) planning approach is needed rather than a community-based needs perspective (see the next point).

In addition, plans for improving the roads network should be carried out in conjunction with plans for improving the information “highways,” since both physical access to markets along with market information are needed.

**Need for planning and management at multi-community level**

Problems associated with remoteness and dispersion of communities and homes within communities, high transport and transactions costs, externalities associated with land-water-forest management, lack of economies-of-scale for certain enterprises would indicate that there is a need for more multi-community regional or territorial approach to planning and management. Watershed level planning and management should be investigated along with other options, such as mancomunidades (i.e., grouping of several municipios).
5. **Summary and conclusions**

The rapid participatory exercises shed some additional light on the assets and livelihoods of the selected communities and respondents from San Marcos and Huehuetenango. This information complements more quantitative household and community level information.

Agricultural production is the main livelihood strategy for the majority of communities and households. However, for the majority of households agricultural production is primarily oriented toward self-consumption. Many of these households are in a “cycle of subsistence” and will need to look outside of on-farm agricultural production for economic growth and poverty reduction. However, improving agricultural production can make an important contribution to food security and the ability to seek off-farm employment. Households with a market orientation might have more prospects for agriculture as an engine of growth, but they face many risks. For all households and communities, there is a need for better integration of land, water, and forestry use to conserve the natural resource base. There is also a need to identify viable farm sizes and appropriate farming systems. This is critical for any sustainable growth and poverty reduction.
**Figure 4.1. Schematic presentation of the asset-based approach**

<table>
<thead>
<tr>
<th>Activos...</th>
<th>...en un Contexto dado</th>
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<tr>
<td><strong>OPCIONES</strong></td>
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</tr>
<tr>
<td><strong>PRODUCTIVO</strong></td>
<td><strong>SOCIAL</strong></td>
</tr>
<tr>
<td>Capital humano</td>
<td>Redes sociales</td>
</tr>
<tr>
<td>Recursos naturales</td>
<td></td>
</tr>
<tr>
<td>Capital físico</td>
<td></td>
</tr>
<tr>
<td>Ahorros &amp; reservas</td>
<td></td>
</tr>
</tbody>
</table>

**Logros de bien estar...**

**Estrategias de vida**

| Ingreso & consumo | Auto-estima | Empoderamiento | Sustentabilidad ambiental | Esperanza hacia el futuro |
| Ahorros | Ocio & recreación | | | |
| Seguridad de alimento | Status de salud y alimentación | | | |

**Guía de facilitación**

| Estrategia de Vida | Recursos Disponibles |
| ¿Qué actividades realizan para ganarse la vida? | ¿Cuáles recursos han utilizado en la realización? |

| Cambios en las Comunidades |
| Resultados Obtenidos de Bienestar | Contexto |
| ¿Qué beneficios han obtenidos de estas actividades? | Políticas e Instituciones | Riesgos |
| | ¿Cuáles normas y reglas regulan el acceso al recurso? | ¿Cuáles son los peligros, temores y riesgos con esta actividad? |
### Figure 4.2. Municipalities/communities visited, regional workshop participants, existence of basic infrastructure

<table>
<thead>
<tr>
<th>Municipio</th>
<th>Community Name</th>
<th>Representatives Attended Regional Workshop</th>
<th>Primary School</th>
<th>Health Clinic</th>
<th>Potable Water</th>
<th>Mini Irrigation</th>
<th>Electricity</th>
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<td>5 de la mañana</td>
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<tr>
<td>De 5 a 8 de la mañana</td>
<td>Juntar el fuego, ir al molino, preparar el desayuno, cambiar a los nov, sacar animales, vender la leche, preparar la refacción, peinarse cuando tienen tiempo</td>
<td>Caminar al mercado para ir a vender Va a vender al mercado</td>
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<tr>
<td>De 8 a 12 horas</td>
<td>Aseo de la casa, cuidado de animales, bañar a los niños, bañarnos, acarreo de agua, lavar los trastos, preparar el almuerzo, lavado de ropa, acarreo de zacate para los animales</td>
<td>Trabajo en hacer lazos Ir al mercado Escuchan radio</td>
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<tr>
<td>De 12 a 3 hr. A 3 horas</td>
<td>Almuerzo, cambiar a los niños, lavado de trastos, dar agua a los animales, recoger la ropa, acarreo de leña, cocer el nixtamal,</td>
<td>Hago costuras Descanso ½ hora Participación de la organización, planchado de ropa</td>
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<tr>
<td>De 3 a 5 de tarde</td>
<td>Preparar la cena, hacer café, refaccionar, recoger los animales, lavado de maíz, cocinar el maíz</td>
<td>Planchar ropa, van a reunión del grupo, van a la iglesia, regreso del mercado de vender</td>
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<tr>
<td>De 5 a 9 de la noche</td>
<td>Servir la cena, ver a los niños, lavar los trastos, acostar a los niños, organizan el trabajo de día siguiente, platicar con la familia, doblar la ropa</td>
<td>Algunas miran tele, escuchan radio, van a las reuniones, leen la Biblia</td>
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<tr>
<td>De 9 a 10</td>
<td>Descansar</td>
<td>Miran noticias con la familia</td>
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Total de horas trabajadas = 16 horas promedio